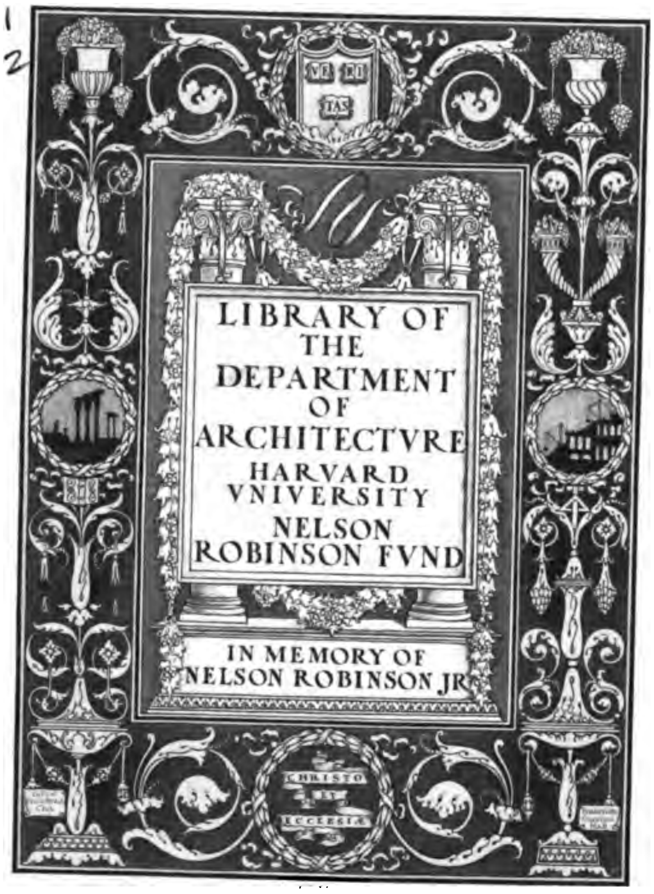

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AND

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THE magazine writers who have taken sociological matters for their themes have for many years made all the world familiar with the evils that are forced upon the submerged tenth through the faulty planning, slovenly care and worse management of tenement-houses, and because of their well-directed efforts a vast improvement has in recent years been made in these buildings, and more enlightened laws have been enacted which force owners to manage and care for such properties in such a way as to eliminate or partly ameliorate the most obvious of the evils to which communistic homes are subject. But there is little that the law or the landlord can do that will tend to extinguish, or will greatly mitigate, the radical evil that makes life in tenement-houses so perilous: that radical evil is merely the force example—example that may be none the less deplorable because it is innocent, or at least is not ordinarily recognized as amongst the moral obliquities of life. Bring together in a single tenement-house a score of families enjoying equal incomes, each of whom has hitherto lived in comfort and contentment in an isolated dwelling, and then add another family whose heads either enjoy a better income or, being of a more reckless nature, are willing to take all sorts of risks for the sake of cutting a dash, and shortly thereafter peace and comfort will vanish from most of the other twenty families, each one of whom, disliking to be outshone, will also try to make a splurge and will sacrifice its children's rights to a "plush rocker," a piano, or a too expensive dress. That means debt, sooner or later, and debt too often means drink.

THE same radical evil, only in a more cost-begetting form, inheres in life in the higher grade of tenement house colloquially known as the apartment-house, and we find apartment-house dwellers led by example to indulging unjustifiably in theatre-parties, fur-cloaks, and automobiles, while relief for the extra worry upon the head of the family is sought not only in drink but in gambling of one kind or another—at the wheel, in "the Street," or on the curb—with the bankruptcy-court as a final scene. But both tenement-house and apartment-house are, seemingly, unavoidable concomitants of the civilization of the day, and architects have to provide them for such owners as wish to invest in that form of property, and architects who have to be so many different kinds of student should not forget when they are called upon to plan such buildings that their problem is fundamentally and primarily a sociological one, and that while they cannot contend successfully against all the evils of gregarious living, they can do much good by segregating each independent home with the most sedulous care to protect its privacy at every point. For example, we do not believe enough use has been made of the corkscrew staircases after the fashion of that at Chamlord, where people ascend or descend in the same cage over two different staircases.

AS the apartment-house is an important problem, we have brought together in this issue a good many solutions, taking care to select those which can be carried out by a single owner rather than those larger ones, of the hotel type, which can only be compassed by coöperating syndicates. In studying the solutions here presented, we have been struck with one general peculiarity present in

each case, and it has so much to do with the matter of "race suicide" that it is rather curious that a Presidential fulmination has not before this been launched at the apartment-house as the very hot-bed and breeding-place of the species of evil which is attracting so much attention nowadays. In no one of the plans here gathered is there any indication that their designers had ever heard of the word "nursery," or comprehended what that word properly stands for in the life of the family and the future of the nation. The obtuseness shown is glaring, for it is precisely in the matter of providing for the care of children that the apartment-house—the home of well-bred people—should be differentiated from the tenement-house. The child of the tenement must, through stress of circumstance, go without his nursery and must live and play in the street; but the child of the well-bred dweller in an apartment-house must, if he too is to be well-bred, be kept out of the streets, and, if he is to be healthy and well nourished, must have a proper play-room for the daytime and an equally satisfactory nursery for the night. In view of these necessities and the desirability of economizing space in planning, the obvious solution is a common play-room at the top of the house or enclosed upon the roof. Further, as a common play-room implies the spreading of the contagious diseases of childhood, it should be companioned in every case by a hospital-ward under the care of a "trained nurse." The time may come when landlords will advertise not only that they employ janitors and elevator-boys, but also that they have always on the spot a "trained nurse."

OUR readers are familiar enough with our views as to the entire propriety and the great advisability of architects signing the buildings they design—at least those that are worth signing at all. Practically the greater part of the profession feels as we do, and it needs perhaps but a distinct recommendation, perhaps a mandatory one, on the part of the American Institute of Architects to establish the custom. Amongst the many things to be done at the convention in Washington next week, time may be found for adopting the needful resolution. While architects often think and speak of the matter amongst themselves, it is not often that a layman complains of the anonymity of noted buildings in the matter of their authorship. But quite recently, in the *Boston Transcript*, Mr. Oscar Fay Adams voices such a complaint, and in doing so, quite unconsciously, strengthens his plea by the errors he himself makes in the ascription of authorship of the buildings he names. Thus, he attributes Page Brown's Appellate Court-house in New York to the elder Le Brun and ascribes the Boston Public Library to Stanford White instead of to McKim. We will say, once more, that the French fashion of signing buildings is worthy of adoption—if carried out with modesty and good taste.

IT really looks as though—if anything can be accomplished through a persistent and consistent stream of searching questions—Attorney-General Carson might succeed in extorting from those cognizant of them the real facts connected with the building and furnishing of the Pennsylvania Capitol. Just now he is turning his efforts to the discovery of how, in what way, and by whom devised, a line of demarcation was established between the work done by the Board of Capitol Commissioners, who had four millions to spend, and the Board of Grounds and Buildings, who succeeded in spending, unexpectedly, nine millions more. An apologist of the latter board, Pennypacker by name and so obviously a connection of the present governor's, writing in *Collier's Weekly*, speaks of the new Capitol, which was declared to have been completed with a balance left over from the appropriation of more than half a million dollars, as "a bare structure of walls, floors, and roofs [that] needed those improvements and furnishings" that it later got at so great a cost, but doesn't seem to perceive the need of explaining how it was that a completed building happened to be merely a "bare structure of walls, floors, and roofs." Amongst many curiosities that seem to be coming to light, one concerns a band, or frieze, of mosaic decoration about the rotunda. This frieze, to be executed in opalescent glass on a background of gold-leaf mosaic, was included in the contract of Payne, the general contractor under the Capitol Commissioners. Later, he was instructed to omit this work and was allowed $8.00 per foot on the 1,823 square feet thus omitted. It is to be observed that this mosaic-work was of such a description that it would have to be made and imported from abroad. Later still, the execution of this same frieze was placed in the hands of Sanderson, the "furnishing" contractor, who was paid for it $18.40 per square foot, and was moreover allowed to carry it out in American materials, for he sublet the job to a Pittsburgh concern and paid them for their work "considerably less than $4.00 per foot," and yet this latter price afforded a fair profit to the sub-contractor! The present State Treasurer, Mr. Berry, has declined to pay certain of the Sanderson bills for painting and decorating, on the ground that he "has already been overpaid to the extent of more than $500,000" on painting account, and at the same time declines to pay Mr. Huston's claim for $50,000, on account of commission, alleging that "the commission is estimated on a fictitious valuation of the work."

ARCHITECTS probably have more trouble in collecting payment for their service in cases of dismissal and substitution than in any others where they have occasion to seek relief in the courts. When such, fortunately rare, cases do come before a court and are settled at all in the plaintiff's favor, it is most commonly on a *quantum meruit* basis. It is worth while, therefore, to note that, after three years' effort, a Pittsburgh jury, under Judge Fraser's instruction, has awarded in full to Messrs. Nirdlinger & Simpson the two and one-half per cent. commission they claimed for work done by them in preparing to build a $50,000 warehouse near Third Avenue and Try Street, Pittsburgh. The case is imperfectly reported, but it appears that the architects' work was approved and they were told to go ahead and get estimates; but, before they could do this, the client turned the job over to another architect, who actually erected the building and was duly paid for his work.

APARTMENT-HOUSES.

WITHIN the past few years certain changes, or rather, perhaps, tendencies toward change, have manifested themselves in apartment-house planning, which are not without interest. One of the most noticeable of these lies in the direction of making the reception-rooms of the separate apartments architecturally more imposing than was formerly the custom. It is natural that owners and designers of such houses should wish to please their tenants; and, as experience has shown that of two apartments, similarly situated and covering equal floor-areas, tenants generally prefer that which has the handsomest entrance-hall, parlor, and dining-room, even though the kitchen may be small and the bedrooms and closets cramped, landlords and architects have learned to adapt their plans to this preference by making as much show as possible in the rooms in which their tenants will receive visitors, even if they have to sacrifice for this purpose the humbler portions of the establishment.

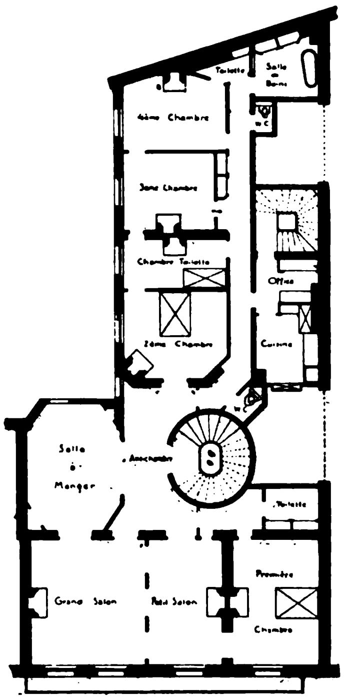


FIG. I. PLAN OF APARTMENT-HOUSE IN THE RUE DÉCAMPS, PARIS. M. POUPINEL, ARCHITECT.

In pursuance of this tendency, the dark, narrow, and crooked passageway, in which a person could hardly walk without touching his elbows on each side, by which the apartments in the older houses were entered, is now generally superseded by a comparatively spacious ante-room, which is planned with great care, so that, by its symmetry, pleasant lighting and elegant decoration it may produce the most agreeable impression possible upon those entering the apartment. Of course, the additional area

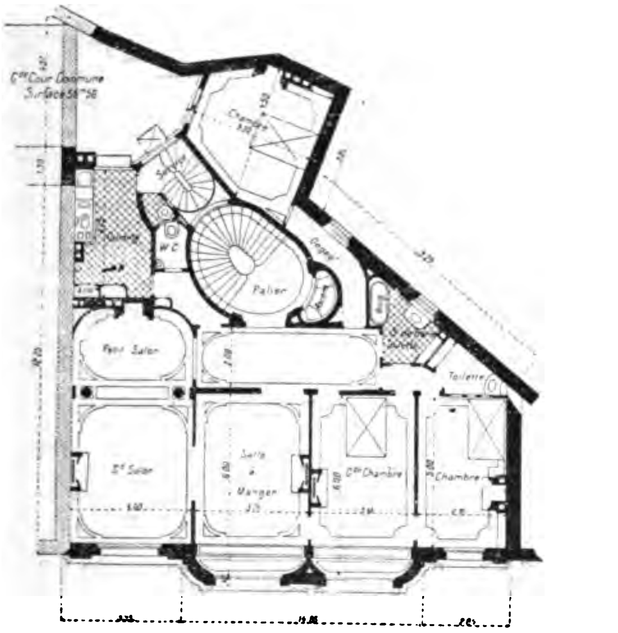


FIG. 2. PLAN OF SMALL APARTMENT-HOUSE, RUE DANTON, PARIS. M. SINELL, ARCHITECT.
(From *La Construction Moderne.*)

given to this entrance-vestibule must be taken from other rooms, but the sacrifice is well repaid by the greater attractiveness, and better renting quality, of the apartment as a whole.

This innovation is particularly noticeable in the French apartment-houses, and some of the Parisian architects display great skill in securing a pleasing effect in the *"galerie,"* as the new type of vestibule is often called, with the least possible sacrifice of room. Figure 1 shows the plan of a small apartment-house on the Rue Décamps, in Paris, by M. Poupinel. The cleverness with which a dignified staircase, enclosing an elevator, is arranged in an oval space twelve feet by thirteen; the spacious effect of the ante-room; the ingenuity of the lighting, and the symmetry of the rooms, will impress the professional reader; but what may not be so evident at the first glance is the peculiarly homelike character of the plan, due partly to the excellent lighting and partly to the studied variety of shape of the rooms, which gives, so to speak, points to which family associations can attach themselves.

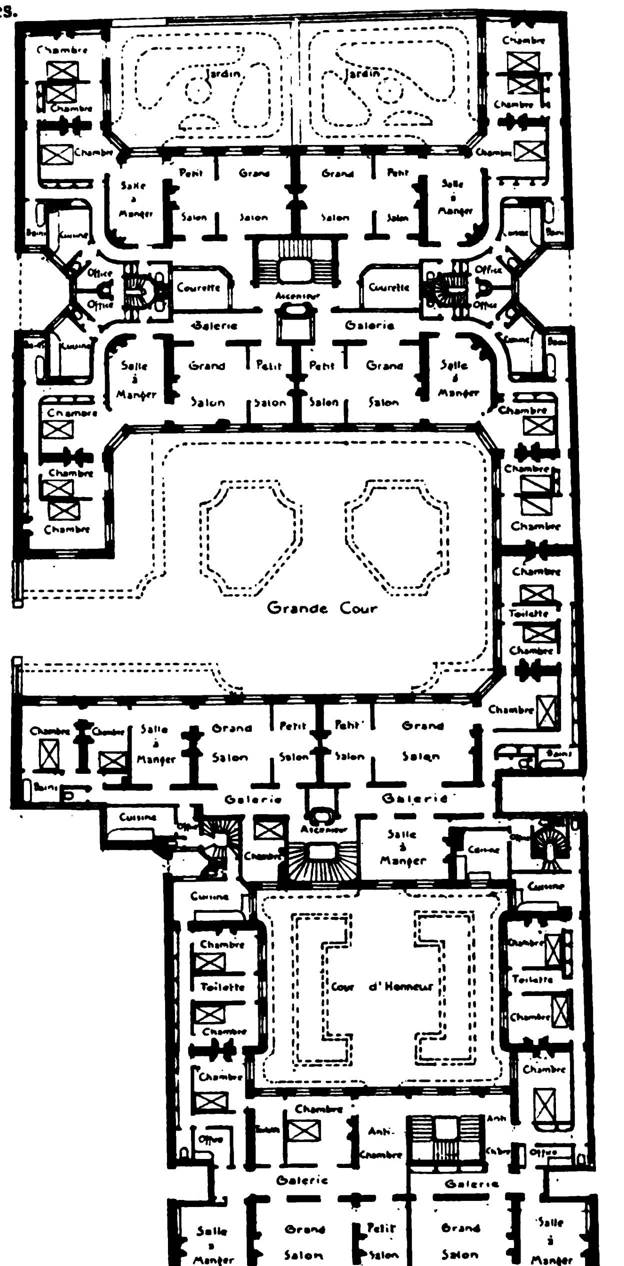


FIG. 3. PLAN OF APARTMENT-HOUSE ON THE BOULEVARD SAINT MICHEL, PARIS. M. NERROT, ARCHITECT.

The same general principles of disposition, adapted to a much larger building, may be traced in the admirable plan (Figure 3) of a great apartment-house on the Boulevard Saint-Michel, by M. Nerrot, where the *"galerie"* of each apartment is so arranged and lighted as to form a tolerable substitute for an additional room.

Another pretty and ingenious arrangement, for an irregular lot, by MM. Morin-Goustiaux and Le Cardonnel, is shown in Figure 4. The left-hand portion only forms the apartment, the right-hand part being occupied by a portion of the Paris offices of the New York Life Insurance Company. The "resting-landing," with a window and a seat, part way up the grand staircase, is quite characteristic of the present inclination of French architects to give an interesting variety to their plans, at the same time that they preserve the traditions of symmetry and dignity in which they have been trained.

Figure 2 gives a wonderfully clever plan, by M. Sinell, for a little apartment-house on a very irregular lot. The rooms are small, according to our notions, the "grand salon" being only

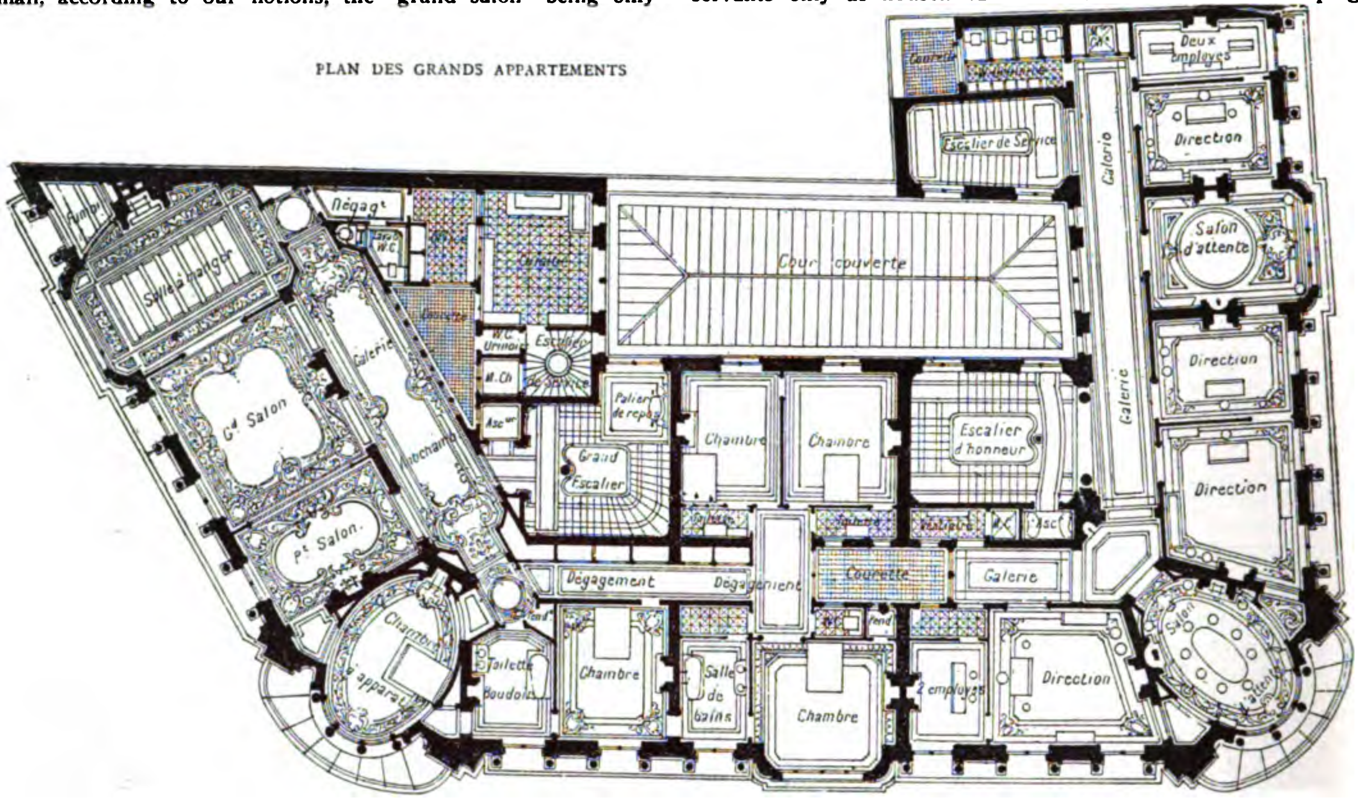


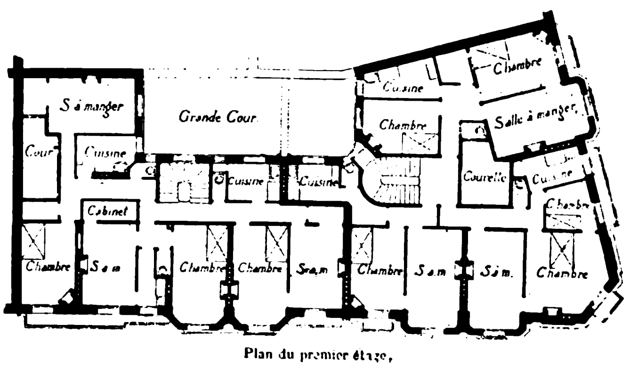
FIG. 4. PLAN OF APARTMENTS AND INSURANCE OFFICES, PARIS. MM. MORIN-GOUSTIAUX AND LE CARDONNEL, ARCHITECTS. (From *La Construction Moderne.*)

thirteen feet wide by a little over sixteen feet long, while the "petit salon" is about eight by thirteen, and the "grande chambre" is eleven by nineteen; but everything is arranged with a dignity and symmetry which would befit a much more spacious establishment and are all the more remarkable in view of the difficulties presented by the shape of the lot. The tiny *"galerie"* is quite charming in its way, and the planning and lighting of the two staircases, and of the elevator, also deserve the careful study of the professional reader.

It will be observed that this apartment, small as it is, possesses a passenger-elevator, and nearly all the most recent apartment-houses in the fashionable quarters of Paris are provided with the same luxury. The elevators ordinarily used are of the direct-plunger hydraulic type. With these the car cannot fall under any circumstances, and, as they run very slowly, the tenants themselves operate them without danger, bringing them from one floor to another by an ingenious system of calls, either electric or mechanical. The water is supplied from the street pressure, and the charge made by the city for its use is said to be extremely moderate.

The reader will note that, while the *"galeries,"* or ante-chambers, in these plans are usually spacious and handsome, the kitchens are of very restricted dimensions. In fact, a kitchen eight feet square is considered quite tolerable in a modern Parisian apartment, while eight feet by ten is almost sumptuous, and a kitchen of this size would be expected to accommodate, at meal-times, a cook and housemaid, if not a footman also. In this country, where family life is not so highly prized as it is in France, the kitchen is often left almost entirely out of so-called "housekeeping apartments," its place being taken by a "kitchenette," consisting of a ventilated cupboard, opening usually out of the dining-room, and provided with a gas-stove and shelves, hooks, bins for flour and sugar, and other fittings. With the characteristic ingenuity of Americans, these kitchenettes are often completely equipped for a great variety of cooking, and they are very popular.

It is at this point that French and American apartment-house plans begin to diverge. While most American housekeepers like to have their cooking done at home, and to gather their families around them at meal-times, they feel it a relief to be independent, on occasion, of servants, and to be able to cook for themselves a breakfast or luncheon on their kitchenette gas-stove, going to some restaurant for their more important meals; but a considerable proportion of well-to-do American families prefer not to do any housekeeping at all, living in hotels or in non-housekeeping apartments, and taking all their meals in restaurants, employing servants only as housemaids or footmen in non-housekeeping apartments, or as lady's-maids or valets in hotels. Both these modes of living are abhorrent to French ideas. Although restaurants in Paris are numerous and cheap, and hotels almost equally so, it is a rare thing to see a French family in a restaurant, unless its members are on an excursion of some sort,



Plan du premier étage.

FIG. 5. PLAN OF APARTMENT-HOUSE, RUE LAMARCK, PARIS. M. MORICE, ARCHITECT. (From *La Construction Moderne.*)

and still rarer to find such a family permanently residing in a hotel. To maintain, therefore, the domestic privacy and comfort which most French people prize so much, a kitchen is necessary, and every Parisian apartment intended for family use, whether it overlooks the Parc Monceau and rents for twenty-five thousand francs a year, or occupies a modest corner on the hill of Montmartre and brings in ten francs a week, possesses a kitchen of some sort. Figure 5 shows the plan, by M. Morice, of the second story of a house on the Rue Lamarck, of very modest pretensions, but planned with great skill, and offering some interesting suggestions. The building stands on a corner, and has two entrances, forming, therefore, two independent houses, each having three apartments on each floor. It will be observed that none of the apartments have any parlors, either large or small. In many American apartments, so compact as to have no parlor, the kitchen would be expanded into a general "living-room," which, with two or three bedrooms, would comprise the whole habitation. This arrangement, however, would not suit French ideas of propriety. Instead of that, each apartment includes a dining-room and a separate kitchen, and one or two bedrooms, all well

lighted and well arranged, although the kitchens, using the beds as a scale, average about six feet by nine in area. The number of bedrooms included in each apartment seems small, but all the

FIG. 6. EXTERIOR OF APARTMENT-HOUSE, RUE LAMARCK, PARIS. M. MORICE, ARCHITECT.
(From *La Construction Moderne.*)

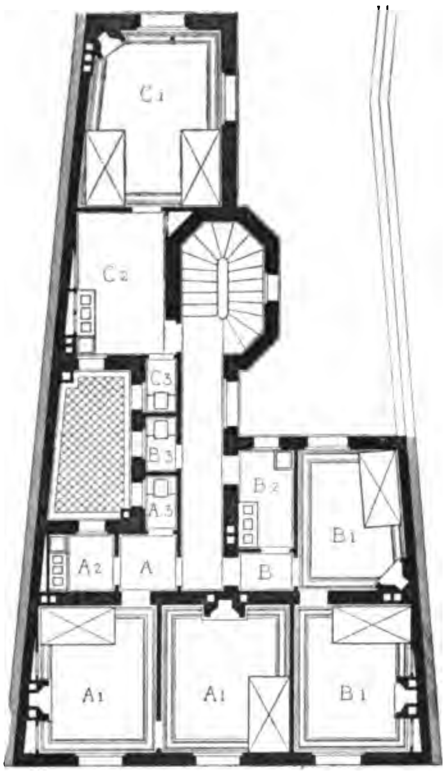


FIG. 7. PLAN OF APARTMENT-HOUSE SHOWING THREE APARTMENTS, RUE DE BELLEVILLE, PARIS. M. HENEUX, ARCHITECT.
(From *Architecture.*)

dining-rooms, by an ingenious arrangement, possess either bays or alcoves large enough to contain a sofa-bed; so that each suite really comprises at least two bedrooms, without sacrificing the pleasant and pretty dining-room which forms the pride of every French family. Those architects who are likely to have apartment-houses to design will do well to note that, on a lot about

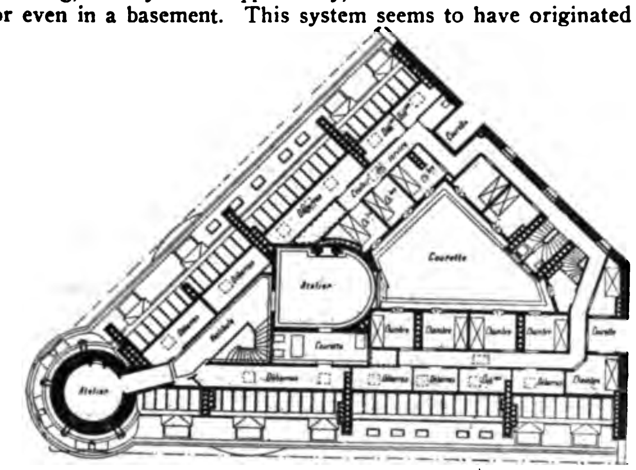
FIG. 8. EXTERIOR OF APARTMENT-HOUSE ON THE AVENUE DE LA GRANDE ARMÉE, PARIS. M. RIVES, ARCHITECT.
(From *La Construction Moderne.*)

forty-five feet by one hundred, M. Morice, covering about ninety per cent. of the lot with the building, has obtained six apartments on each floor, every room and every staircase being well lighted and aired. The average rent of these pleasant little habitations is five hundred and ten francs a year, or less than two dollars a week; yet, even at these modest prices, the net revenue from the building is estimated at five and one-fifth per cent. on the cost of the whole property, including the land. Figure 6 shows the exterior of the building, which is beautifully situated near the top of the hill of Montmartre, and is far from suggesting anything like poverty.

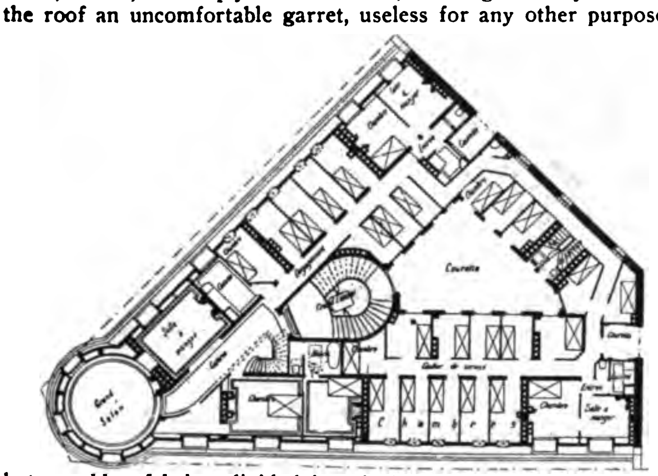
Figure 7 gives the plan of some still more abbreviated apartments, each consisting of a kitchen and two bedrooms, or, in the case of the rear apartment, of one bedroom large enough for two beds. The arrangement is not so skilful as that of some of the plans that we have studied, one bedroom serving as a passageway to another, while the kitchen of the "A" suite is less than six feet square; but it is not without interest.

Turning from these modest abodes to those of higher pretensions, we shall find, in the more expensive apartments of recent construction in Paris, certain tendencies which are to be regretted, and which are deplored by the Parisians themselves. It is hardly necessary to say that people living in apartments comprising only two or three bedrooms, like those which we have just been studying, usually do their own housework, or, at most, are assisted by one of those faithful creatures, more friend than servant, who form a part of so many French families; but people who live in larger and more luxuriously furnished dwellings, and entertain much company, need more elaborate service, and, consequently, a larger number of servants. Here, however, arises a difficulty. In apartment-houses in the fashionable quarter, where land is expensive, the increase of the area covered by each apartment, to accommodate two or three servants' rooms, involves a very sensible addition to the rent; and the custom has grown up of devoting all the space in the more rentable portions of such houses to what are called by the rather unrepublican name of "masters' rooms," including among these the kitchens, as being necessary to

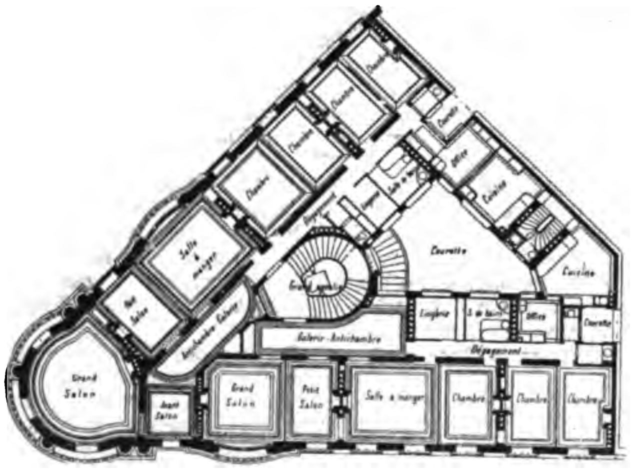
the masters' convenience, and putting the servants' bedrooms for all the apartments together, in the least attractive part of the building, usually in the upper story, but sometimes in a mezzanine, or even in a basement. This system seems to have originated in



New York, where it was used, in occasional instances, many years ago; but, in an evil hour, it was imitated, or re-invented, in Paris, where, to comply with the laws, buildings usually have in the roof an uncomfortable garret, useless for any other purpose,



but capable of being divided into bedrooms, or rather cells, for the servants belonging to the families inhabiting the apartments below. Figures 8, 9, 10 and 11 show the exterior and three plans of a charming apartment-house in a very fashionable quarter of



FIGS. 9, 10, 11. PLANS OF APARTMENT-HOUSE, AVENUE DE LA GRANDE ARMÉE, PARIS. M. RIVES, ARCHITECT.

Paris, by that accomplished architect, M. Rives. Professional readers will not fail to appreciate the skill with which the entresol, with the balconies over it, is made to form a transition between the plate-glass shop-fronts of the entrance story and the architectural features above, and to admire the richness and delicacy given to the composition by the curves of the cornice. It would be difficult to treat an angle more beautifully. In Figure 9 is shown the general plan of the apartments, two on each floor, with passenger-elevator, bath-rooms, and so on, all well lighted and most skilfully arranged. Figures 10 and 11 show the plans of the seventh and eighth stories, devoted mainly to the servants. There are twelve apartments in the house and thirty-five servants' rooms, or about three to each family. This indicates that the tenants are supposed to be comparatively rich and fashionable people, yet, unless they are willing to give up some of their family-rooms, all their servants, both men and women, must be huddled together in little cells, some of them, according to the scale, not more than five feet wide, opening upon dark and narrow corridors; while, being directly under the roof, the rooms are cold in winter and hot in summer. Even if the servants were allowed to use the passenger-elevator, which is not always the case, it only runs to the seventh story, so that the weary housemaids and footmen must climb afoot to their comfortless rooms. In this particular case a most commendable attempt seems to have been made to give these young and untaught people some sort of protection and supervision, by arranging two little apartments among the servants' rooms, which can be occupied by a housekeeper or a couple of married servants, and afford a resource, not only for

FIG. 12. EXTERIOR OF "ANSONIA" APARTMENT-HOUSE, NEW YORK. (From the *Engineering Record.*)

supervision, but for friendly care and attention to those that may need it; and it seems to have been intended to put the women servants in the seventh story and the men in the story above; but it is rare to find examples of such careful humanity, and in most cases in Paris, and still more in this country, the maids and footmen are not even separated, much less placed under supervision. It is hardly necessary to say that under such circumstances, where there is neither privacy nor protection for the innocent, the morals of all the members of the little community are at the mercy of the worst among them. René Bazin, in his touching story of *"Donatienne,"* speaks with merited severity of this system, and his descriptions of life in the servants' quarters of a fashionable Parisian apartment-house apply equally well, as many housekeepers can testify, to similar apartment-houses in New York and Boston. The modification of the ordinary arrangement, in the direction of morality and humanity, seen in M. Rives's plan, shows the effect of the enlightenment of French public opinion; but no similar modification seems to have been as yet introduced, or even demanded, in this country. There is, as a matter of fact, much less excuse for herding servants together in American cities than in Paris, for the reason that our building-laws do not require Mansard roofs, and, in consequence, garrets are not necessary features of our houses. On the contrary, as our apartment-houses almost invariably have flat roofs, and are well supplied with elevators, the rooms in the upper stories are as desirable, and as easily rented, as any others; and the only advantage to be gained by separating the servants' quarters from the

rest of the house is usually a small economy in the finish of the corridors; yet, notwithstanding its demoralizing influence, the system grows more popular here every day.

In the best and most costly American apartment-houses, however, even where housekeeping is not attempted, at least one servants'-room is usually attached to each apartment, others being often provided in a different portion of the building, which may be rented separately as required. Figure 13 is a floor-plan of the famous "Ansonia," in New York, intended by its owner to be the most perfect apartment-house ever built. The plan presents several characteristics which are peculiarly American, but are not less commendable on that account. One of these is the substitution of deep recesses in the fronts for a central court-yard. This disposition is now very common here, in planning, not only apartment-houses, but hotels and even office-buildings, and presents the obvious advantage that the rooms in the middle of the building look out on the street, instead of into an enclosed court-yard, and are much pleasanter and better aired in consequence.

Another peculiarity of the plan is that the rooms are so arranged and connected that the number of bedrooms attached to each apartment may be varied. In building hotels it has long been considered essential in this country to arrange the plan in such a way that any desired number of connected rooms can always be placed at the disposal of guests, and the application of the same principle to apartment-houses is now considered to be equally advantageous. In the "Ansonia," for example, a possible tenant may be offered one room "without bath," one room "with bath," or combinations of almost any number of rooms, up to fourteen, with several baths and with or without kitchens. Each suite containing a kitchen has also a dining-room and a servants' bedroom, but those tenants who do not care for housekeeping can have their meals either in private dining-rooms or in a large public dining-room at the top of the house. For tenants who like society, a ball-room is provided on the entrance floor, while those who prefer athletics have a swimming-bath for their use in the basement, where a storage-room for automobiles is also to be

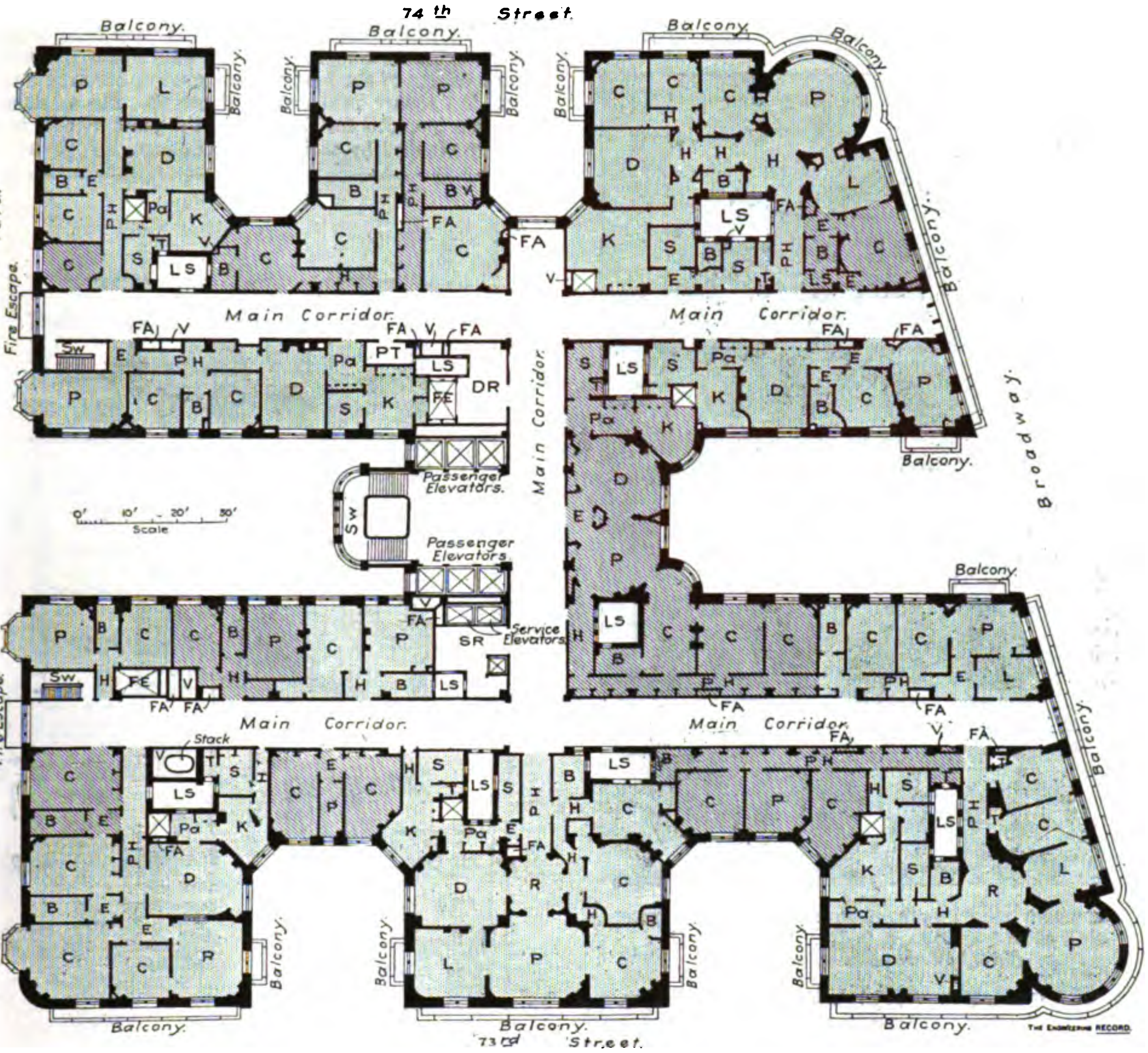


FIG. 13. PLAN OF "ANSONIA" APARTMENT-HOUSE, NEW YORK.
(From the *Engineering Record*.)

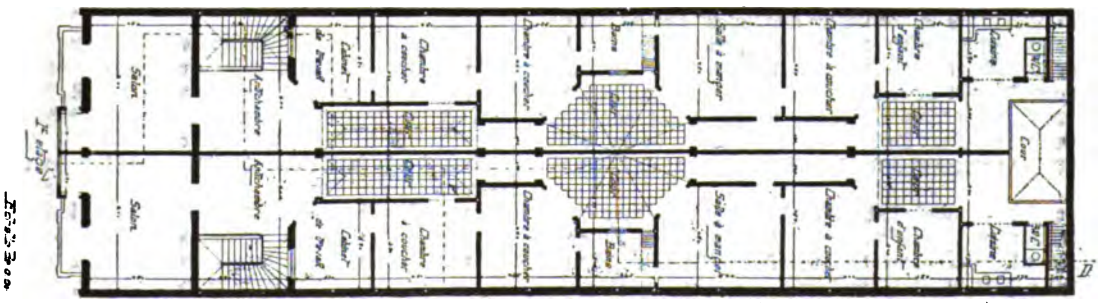


FIG. 14. PLAN OF APARTMENT-HOUSE AT MONTEVIDEO, SOUTH AMERICA. MM. ACOSTA Y LARA & GUERRA, ARCHITECTS.
(From *La Construction Moderne*.)

found. Figure 12 shows the outside of this remarkable building.

As a curiosity in the way of apartment-house planning, Figure 14, which shows a house at Montevideo, in South America, is not without interest. The entrance-story of the building is occupied by a store, with windows only in front, light being given to the middle and rear portions by three large skylights and an air-shaft. The skylights in the ceiling of the store form the floor of open spaces in the story above, which are divided by a longitudinal partition running through the middle of the building, and thus constitute six small court-yards, or *"patios,"* around which are grouped the rooms of two apartments, each of nine rooms and bath. In the favored climate of Montevideo there is no need of windows for keeping out the weather, and only the parlors and the bath-rooms have any, the other rooms taking light and air from the doors opening on the courts. The building is only two stories high, and each apartment, having a separate stairway to the street, is virtually an independent house. Figure 15 shows the front of the structure.

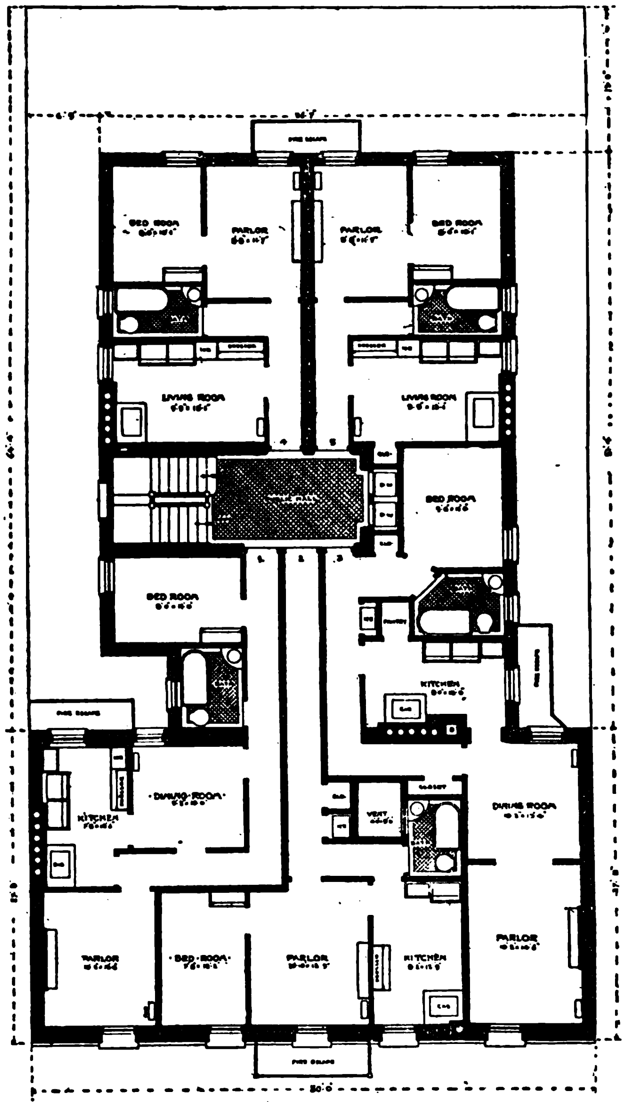
FIG. 15. STORE AND APARTMENTS AT MONTEVIDEO, SOUTH AMERICA. MM. ACOSTA Y LARA & GUERRA, ARCHITECTS.
(From *La Construction Moderne.*)

It is not in first-class apartments that republican institutions find their surest and safest footing, and a survey of the improvements that have been made in "collective dwellings" should not be concluded without some notice of recent ameliorations in the planning of tenement-houses of the more modest sort. In New York, where three-fourths of the population live in such houses, improvement has been particularly rapid, owing to the adoption and enforcement of judicious laws, and the change from the tenement-house of twenty years ago to that of the present day is surprising.

It is rather touching to find that, in the houses which have been erected in great numbers in New York by speculating builders since the passage of the Tenement-House Act, a "parlor" almost invariably forms a part of each tenement. Even where there is only one bedroom, as in the rear tenements in Figure 16, there is a parlor which the mistress of the little establishment can keep pretty and neat, for the sake of her own self-respect, and that of her family. The front flats in this particular house are more pretentious, possessing a dining-room, as well as a parlor; but they are neither so pleasant nor so well planned as those at the rear.

Figure 17 shows a compact plan for several houses, in which the kitchen takes the place of an entrance-hall to each flat, four kitchen doors opening from each stair-landing. The room thus saved affords an extra bedroom to three out of the four tenements on each floor, but there are no bath-rooms, and it is a question whether the plan could not have been better arranged.

No architect needs to be told that economy in planning buildings of this sort is very much promoted by increasing the area to be treated, and many of the most interesting and successful of the recent New York tenement-houses have been built on large lots by architects competent to deal with important problems. A portion of one of the best of these groups, covering a tract about ninety feet square, is shown in Figure 18. The tenements in this block are intended for families of the most modest income, but they are planned by their skilful designer, Mr. James E. Ware,



NO. 4.

FIG. 16. PLAN OF NEW-LAW TENEMENT-HOUSE IN NEW YORK.
(From the New York *Evening Post.*)

with as much care as if they were palaces. No bathrooms are provided, the owners knowing that, for such tenants, a bath-room is a costly and useless superfluity; but each little dwelling has its own water-closet, not opening out of the kitchen, as is often seen, still less out of the public staircase-hall, but conveniently placed among the bedrooms, and with a window to the outer air. Of bedrooms there are one, two or three to each tenement, to suit different families, and not more than one bedroom in each tenement opens from the living-room, the others having separate entrances from the little private hall of the tenement. In this way a married couple with young children, or with only girls, or only boys, can be comfortable with two bedrooms, themselves occupying one, while the children have the other. If they have both sons and daughters, they can have three bedrooms, using for themselves the one opening from the living-room, while the girls occupy the second, and the boys the third. In this way, and only in this way, can the modesty and self-respect of children be preserved, and Mr. Ware has provided for their needs with a sympathy and delicacy which cannot be too highly praised.

But this is not the only merit of this charming plan. The professional architect will not fail to notice with approval the spacious and well-lighted stairs, free from winders; the lift on each landing, and the convenient arrangement of the living-rooms, which, although fitted with dressers, sinks and wash-trays, are more than kitchens, being spacious enough to form, as is intended, a pleasant family sitting-room.

this is quite unnecessary, as Mr. Ware's plan shows, and the result of such an arrangement is to expose the natural modesty of children to continual shocks, which soon show their effect upon the manners, if not on the character.

Apart from this defect, which is a serious one, the stairs wind awkwardly and dangerously, and the living-rooms are too small in proportion to the bedrooms. In the corner suites the living-

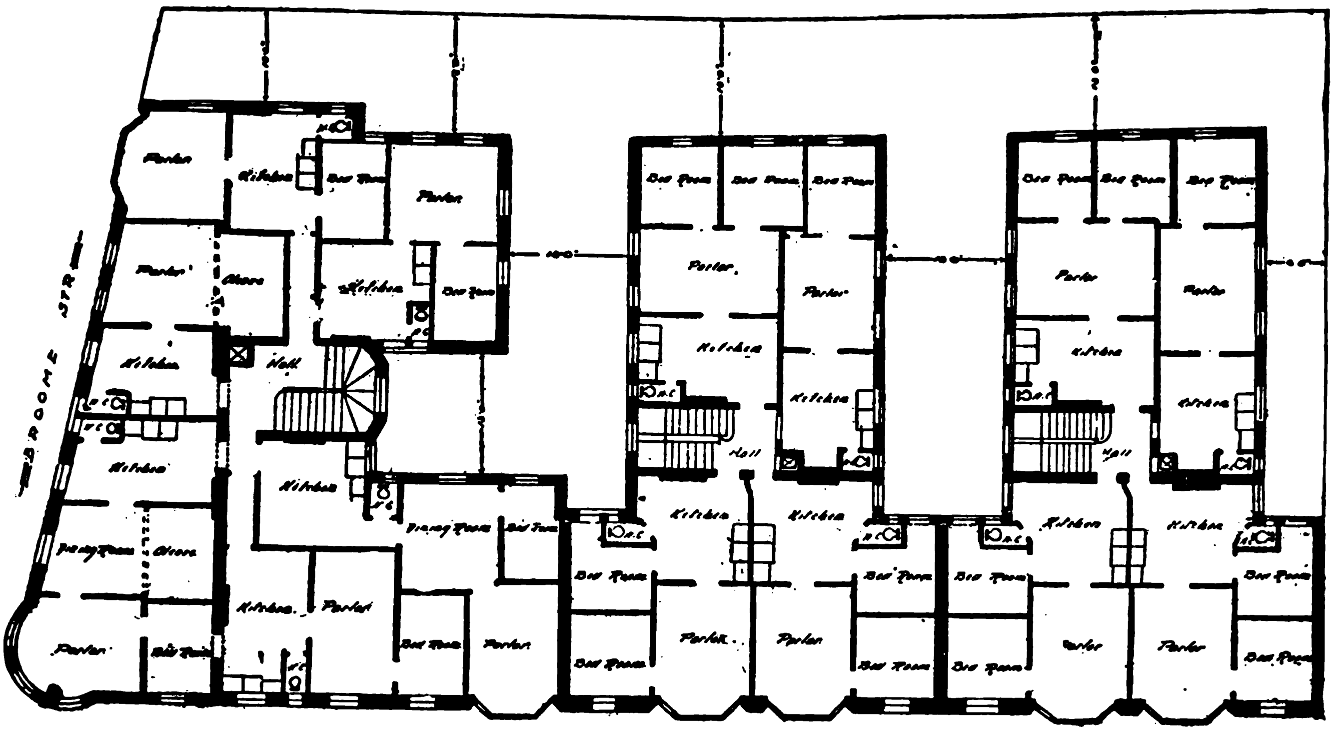
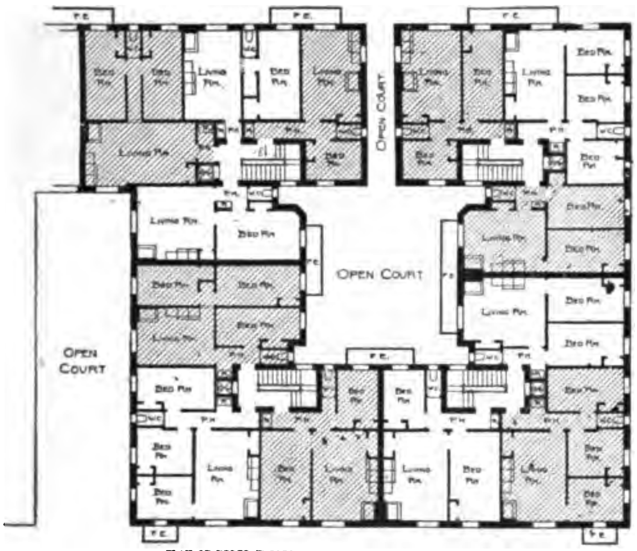


FIG. 17. PLAN OF TENEMENTS ON BROOME STREET, NEW YORK. MESSRS. SASS & SMALLHEISER, ARCHITECTS.
(From the New York *Evening Post*.)

Figure 19 shows a house of very similar general outline, by Mr. Ernest Flagg. Notwithstanding Mr. Flagg's great reputation as a planner, the arrangement is inferior to that of the house just studied. The placing of the water-closets between the main hall door and the living-room, although it has plenty of English

room is not more than half as large as the largest bedroom. If the living-room simply served the purpose of the kitchen of a Parisian apartment, such a proportion might be tolerated, but in an American tenement of this class the living-room is much more than a kitchen. Being the only room with a fire, it is necessarily



PLAN OF UPPER FLOORS. JAMES E. WARE, ARCHITECT.

FIG. 18. PLAN OF TENEMENTS IN NEW YORK. MR. JAMES E. WARE, ARCHITECT.
(From *Architecture and Building*.)

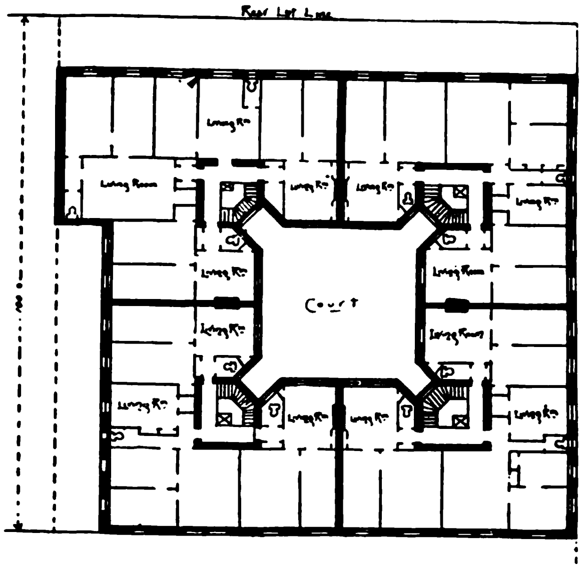


FIG 19. PLAN OF TENEMENTS IN NEW YORK. MR. ERNEST FLAGG, ARCHITECT.
(From the *Builder*.)

precedent, is objectionable, and the arrangement by which the water-closet is made to open out of the living-room, as in one of the corner suites, is not less so. Most of the tenements have two bedrooms, only the corner suites having three; but all the bedrooms open out of the living-room, or from each other, neither disposition being worthy of commendation. In the front corner suites, for example, a young person, to reach the water-closet from the smallest bedroom, must pass through both the other bedrooms, and in front of the main entrance door; and, in nearly all the other suites, the route lies through the living-room. All

the family sitting-room in winter, and is so by habit in milder weather, and provided this be airy, comfortably warmed, well lighted and pleasantly arranged, the members of the household will be quite contented with small bedrooms.

All this is a matter of more importance than may at first appear. It is, perhaps, only by an unwarranted stretch of fancy that we can speak of a Vestal fire of anthracite coal in an American cooking-stove; yet no fire kindled from the Vestal flame in a Roman dwelling ever shone upon more faithful conjugal affec-

tion, or more tender and self-sacrificing family love than is to be found about the little stove in thousands of New York and Boston tenements. For us architects it should be a sacred duty, if occasion offers itself, to protect the happiness and purity of these modest homes by all the resources that lie within our art. Not only in arrangement, but in studied lighting and good proportion,

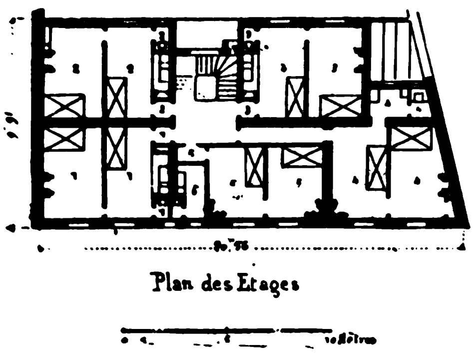


FIG. 20. PLAN OF TENEMENT-HOUSE IN THE RUE JEANNE D'ARC, PARIS. (From the *Deutsche Bauzeitung*.)

the pains and skill bestowed on the designing of living-rooms, especially, will be well repaid. It is only necessary to see the beautiful displays of window-gardening which adorn the kitchen or rear balcony of many a tenement, to realize how well qualified many of these little households are to appreciate artistic effort on their behalf. William Morris once said that the secret of making poor people contented and happy lay in making their dwellings artistically attractive; and, in working for those whose ambitions and affections are centered in their homes, it is hardly possible to spend too much care in providing that those homes,

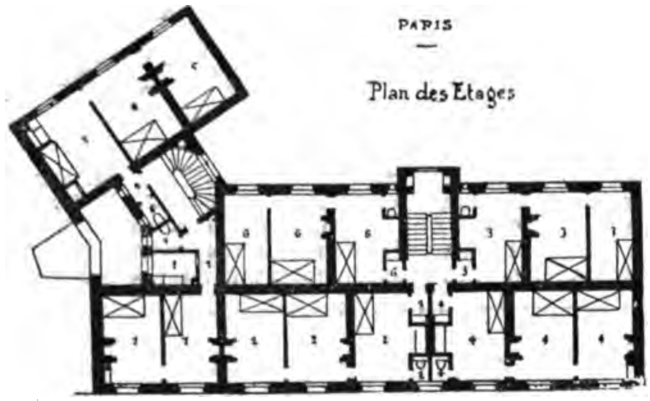


FIG. 21. PLAN OF TENEMENT-HOUSE IN THE RUE DE GRENELLE, PARIS. (From the *Deutsche Bauzeitung*.)

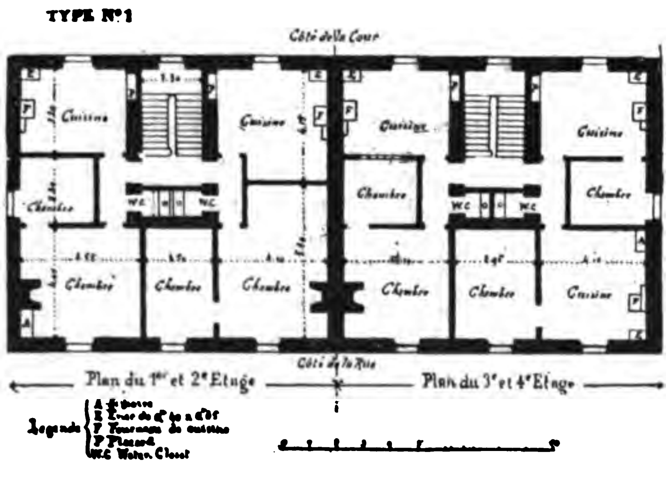


FIG. 22. PLAN OF TENEMENT-HOUSE AT LYONS. (From the *Deutsche Bauzeitung*.)

so far as they are dependent upon material conditions, shall be pure and lovable.

Some of the foreign builders of workingmen's dwellings are much less advanced than the New York architects in combining economy of construction with property and convenience in arrangement. Figure 20 represents a tenement-house in the Rue Jeanne d'Arc, in Paris, and Figure 21 a house in the Boulevard de Grenelle, both supposed to be models of their kind. In both of these, as will be observed, the bed-rooms form passageways, it being necessary, in every case, in order to reach the most distant bedroom, to pass through all the others. In these houses the kitchens serve as bedrooms, the sink and the little charcoal stove being placed in recesses. In Figures 22 and 23, showing houses at Lyons, the kitchen is separate, although in

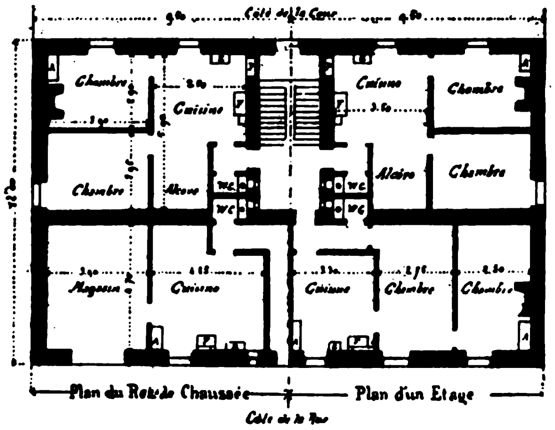


FIG. 23. PLAN OF TENEMENT-HOUSE AT LYONS. (From the *Deutsche Bauzeitung*.)

Figure 22 it is provided with an alcove for a possible bed. In both the plans the water-closets are without either light or air, and in Figure 22 one of the bedrooms has only a borrowed light, and no air.

Figure 24 is the plan of a group of tenements in Edinburgh. American architects will marvel at the idea of putting fireplaces in bedrooms less than ten feet square, opening directly out of the living-room, in the climate of Edinburgh; but, to the British mind, the fireplace is a sort of fetish which cannot be dispensed with. Whether the Edinburgh housewives ever go to the trouble and expense of making fires in these superfluous conveniences is another matter. The arrangement by which four tenements on

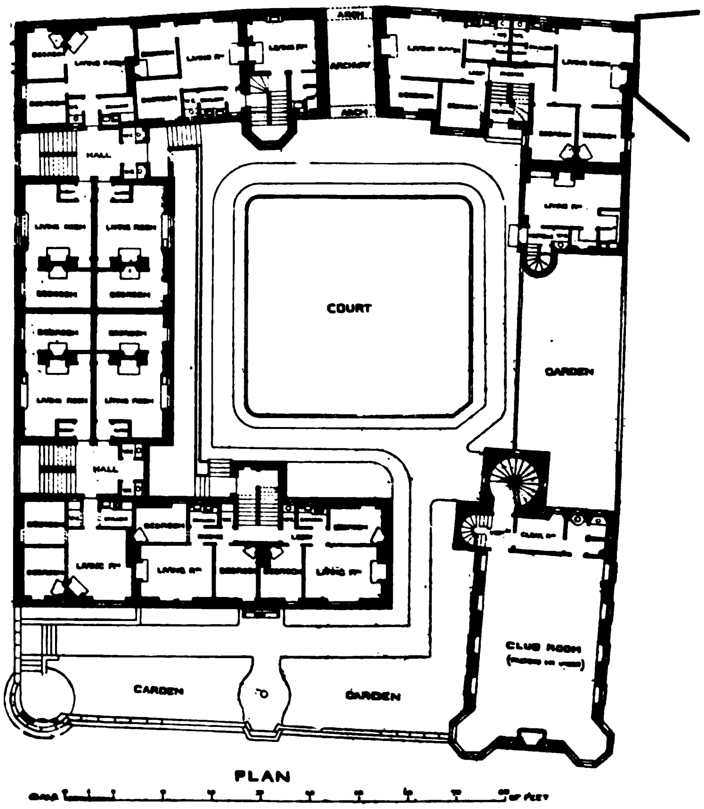


FIG. 24. PLAN OF TENEMENTS IN EDINBURGH. MR. SIDNEY MITCHELL, ARCHITECT.

each floor have their only water-closets in the public hall is the reverse of commendable, and water-closets of two other tenements on each floor ventilate into the same public hall, just over the stairs. A peculiar and characteristically British feature of the group is the provision of a club-room, in which presumably the

male tenants meet and smoke in the evenings. This proceeding is supposed, in Great Britain, to have a wonderfully soothing effect upon the morals of workingmen, and such clubs, generally provided by private philanthropy, are to be found almost everywhere. We remember visiting one in a large town in the South

FIG. 25. EXTERIOR OF TENEMENT-HOUSE GROUP IN EDINBURGH. MR. SIDNEY MITCHELL, ARCHITECT.

of England: It was well arranged, pleasant and comfortable, and supplied with books and newspapers. A man who was reading came forward, with the frank politeness natural to an English workman, to welcome the stranger, and, in reply to some compliments on the pleasant aspect of the place, expatiated on the moral benefit that he had received from it, in being kept, by its attractions, out of worse places. Presumably, only unmarried men are admitted to such clubs, for it would be repugnant to American feeling, at least, to entice married men away from their own firesides; but if this is the case, it is, at least, singular to see, in the present plan, such a club-house connected with a block of tenements planned entirely for families.

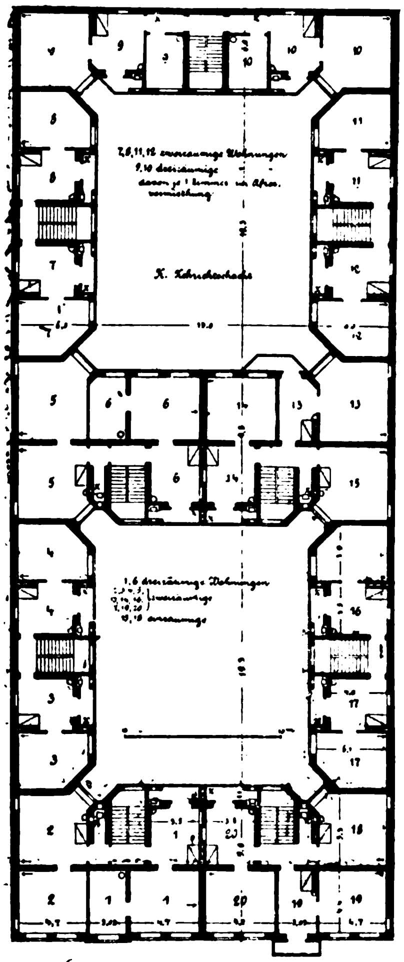


FIG. 26. PLAN OF TENEMENT-HOUSE IN BERLIN.
(From the *Deutsche Bauzeitung*.)

Figure 25 shows the exterior of this picturesque group.

In Figure 26 we have a tenement-house in Berlin, which has some good points, although it does not compare in convenience and skilfulness of planning with such a building as that by Mr. Ware, in New York. Like the New York building, however, it provides one, two, and three-room tenements, in general well-arranged, although, in the three-room apartments, two of the rooms form the passageway to the third. The balconies outside the kitchens, like the fire-escape balconies in Mr. Ware's plan, and, presumably, in Mr. Flagg's plan also, afford an opportunity for hanging clothes out to dry, without carrying them up to a common drying-ground on the roof, as is usual in this country. The water-closets opening on the balcony would be excellent in a warm climate, but entirely inadmissible in that of New York; and, even in Berlin, they must be specially protected.

It will be observed that the foregoing plans for tenement-houses do not, as a rule, provide for bath-rooms. Notwithstanding the outcry made by some sentimental people a few years ago about the importance of bath-rooms in cheap tenements, an outcry which nearly resulted in the passage of a law compelling the provision of such conveniences in all new tenements in New York, it is now well understood that in the great majority of cases a bath-room in a two or three or four room flat simply occupies valuable space, and adds materially to the cost of the building and of its maintenance, and to the rent of the tenements, with no corresponding advantage. In the modest households which the Tenement-House Law seeks to protect, a tubful of warm water for bathing is practically unattainable with the resources at the command of the family; and soaking in a tub of cold water is often dangerous. Hence the bath-tub, where it is provided, without costly means of heating the water, is practically never used for bathing by the occupants of tenements. Instead of that the people who have to pay rent for it, and assume the responsibility of keeping the pipes from freezing in winter, usually compensate themselves by utilizing it for storage. We have seen a bath-tub used as a coal-bin, for which many people find it well adapted; and it also serves frequently for keeping potatoes and other vegetables. In large families it has been known to form the regular bed of one of the children; and, in a case in a Massachusetts city, the ingenious lessees had utilized it as a pen for a little pig that they were rearing. The sides were so smooth and slippery that the pig could not climb out, and it would have been difficult to invent anything better adapted to the purpose. Of course, it does not follow that people who do not have bath-tubs cannot be clean. A sponge and a pail of water, or a tin bath, with hot water enough for such appliances, are within the reach of every one; and those who wish for an occasional soak in a tub of warm water can have it in the public baths, now to be found in every large city, at a fraction of the expense involved in having it at home, even if it were practicable there.

With the bath-rooms may be classed the sculleries, once extensively copied in this country from English examples, but now practically obsolete here. The tenement scullery was always, in winter, a source of anxiety and expense to landlord and tenant alike, and economy, neatness, and comfort have been gained by leaving it out, and putting a small porcelain sink, and one or two wash-trays, in the kitchen or living-room, which is always heated in cold weather, and where, with a little care, the operations of cooking and washing can be carried on without slop or dirt.

T. M. CLARK.

IVANHOE COURT, BOSTON.

BOSTON architecture has the reputation of being conservative almost to the last degree. Innovations and new ideas which depart radically from existing types are supposed to be restrained. Presumably nothing but tried and proved materials and methods of construction are considered by the Boston architects and builders. That this conception is entirely erroneous is an assured fact, as several of the buildings constructed within the last few years can readily bear witness.

Ivanhoe Court, of which C. H. Blackall, Boston, is the architect, is an apartment-house recently constructed at Allston, within the city limits of Boston. This building, which stands out prominently as a pioneer in the line of concrete-block construction, consists of six separate, yet continuous, buildings, with accommodations for thirty families.

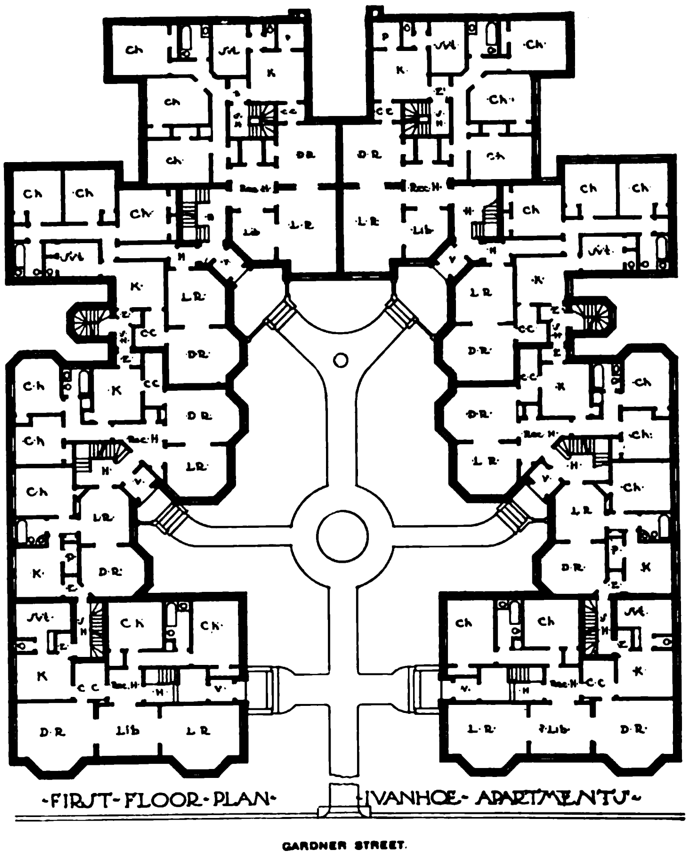
The conditions of the problem were such that a very irregular outline in plan was necessary and a modification of the early English Tudor style of architecture was adopted as the best suited to fulfill these requirements. The selection of Ivanhoe as the name of the building afforded an opportunity to use armorial bearings and ornamentation which, neither being historically correct as to the period of the architectural style, might emphasize salient points in the novel from which the name was derived.

Each of the six entrances is named after some character in the novel and has an appropriate bit of ornament in the architectural treatment of the doorway. In front of each entrance, as shown in the accompanying cut, is a low-tiled terrace, with balustrade and buttresses.

The walls of the front and toward the court are composed entirely of concrete. The water-table, belt-courses, cornices, and all molded and ornamental work are made of "granite composite," a material of excellent texture and appearance. All of

this work was made by Emerson & Norris, of Boston. The walls up to the water-table, including buttresses and steps, were cast in place. The rest of the wall was built up of concrete-blocks and set in place exactly as stone would be used.

The ashlar is of a dark-gray tone and has a surface very similar to sandstone. The trimmings of "granite composite" are a little lighter in tone and have a hammered or tooled surface. It would be difficult to find a building constructed of any other material which has a better effect in its harmony of color.



In the execution of the moldings and the ornamental work, nothing in cut-stone could be produced which would excel in accuracy of line or in the quality of the carving. All the edges of the stone moldings and the undercutting of the ornament are as clean and sharp as could be obtained in any material. The objection has frequently been raised that it is impossible to obtain sharp arrises or deep undercutting in ornamental work in concrete, or in fact to obtain anything but dull, flat attempts which would be absolutely devoid of interest from an artistic point of view. The models and photographs of the armorial designs and other ornament used in this building have served to convince many sceptics that the last word has by no means been said in the use of concrete, but that a new field has been opened and that a wide range of possibilities has presented itself to the architect who wishes to use concrete but who has hitherto been deterred by lack of knowledge of the subject.

CHARLES A. WHITTEMORE.

APARTMENT-HOUSE ON THE RUE DE LA TASSE, PARIS.

ON a terrace high above the Seine, with a beautiful outlook over the gardens of the Trocadero, bright with their many flowers and gay with the sparkle of water in the cascades and fountains, stands a little group of aristocratic-looking houses. A few of them are private, but most of them are apartment-houses of the better type. They have all sprung up within a very few years with the opening of several new short streets. The site was so exceptional, not only with the charming foreground above-mentioned, but with a view over the broad expanse beyond the river, past the Eiffel Tower and across the Champ de Mars to the whole of the south part of the city extending into the fields in the distance, that the character of the houses to be erected thereon was immediately determined.

With one exception the houses are in the style with which we are so familiar in photographs of Paris. This one exception seems particularly worthy of study, on account of the originality of its design and the conscientiousness with which it is carried out.

It was built in 1905 by M. Sorel, a young man, who was already quite well known in Paris for the individuality of several houses he had constructed. The present building is, in a sense, a result of his endeavors in previous work, where he profits by his earlier mistakes to make the best of the present opportunity.

As we can see from the photographs, the treatment of the exterior is not archæological. None of the *motifs* have precedent in the historical styles, yet the whole is so well studied that it is harmonious and well in scale. Color is given to the façade by the use of several different materials; play and variety, by the bays, loggias, balconies, and by the contrasting of curved and straight lines. The details of this we discuss later. M. Sorel is one of a very small group of men who are fighting the conservatism of the architecture of the "School" on the one hand, and the vulgarity of the wild and unrestrained attempts of the "Art Nouveau" on the other hand. The middle path which this group is following is quite deserving of appreciative study, for it is perhaps the most difficult field of all.

First let us look at the plan, in order that we may the better appreciate the problem. The building is U-shaped, or, better, E-shaped, the slight projection of the stair forming the short middle arm of the E. It faces east, looking out on the unbroken view above described. The two sides come against party-walls, the rear of the house opens into a similar court at the back of the house on the next street. The building is 93 feet square, the court being 38 feet deep by 55 feet wide. That leaves the body of the house 55 feet deep and the wings at the rear 20 feet wide.

We enter, as in all Paris houses, by the porte cochère through a large elliptical-headed door closed by iron grilles glazed with rippled-glass backs. This brings us into the vestibule with the

LOGGIA OF HOUSE ON THE RUE DE LA TASSE, PARIS. M. L. SOREL, ARCHITECT.

conciergerie on the left, the steps to the stair-hall on the right, and the carriage-way continuing directly to the court at the rear. The vestibule is in a creamy-white limestone, with plaster ceiling and cement floor.

The concierge's apartment, on the left, consists of a large room with drab wood panel strips, white plaster walls, oak floor, herring-bone pattern, and a gray marble mantel. In one corner is a bed alcove, beyond which is a small kitchen.

Between the concierge's rooms and the party-wall there is a narrow service-entrance, with a door into the concierge's rooms. This opens upon a corridor to the service-stair which we find giving on the court.

The court is ample in size and bright, as it is very shallow and as the walls surrounding it are a very light buff in color. To the left of the carriage-entrance to the court is a garage: beyond that a carriage-house. In the middle of the back of the court is a one-story brick-and-iron stable containing two box-stalls. Between the stalls and the carriage-house is a covered carriage-wash.

The stair-hall in the middle of the back of the buildings contains a circular stone stairway, five feet wide, and an elevator. The hand-rail and the elevator enclosure are of iron similar in style to the exterior. An electric automatic elevator system is used.

On the right-hand side of the ground floor there is a small apartment. You enter directly from the hall into what is known as an antechamber, from which open all the principal rooms. It is lighted from a little court against the party-wall. On the street side there is a salon and a chamber. On the court we find the dining-room and the kitchen. At the corner of the wing there is a bath-room, beyond which are two bedrooms. The water-closet opens onto the little court.

ENTRANCE: HOUSE ON THE RUE DE LA TASSE, PARIS.

The three succeeding floors are alike in plan, in each case a single apartment occupying the whole floor. The apartments are entered from the stair-hall through an antechamber, as on the floor below. Across the façade is a line of rooms, uniformly 20 feet deep, consisting of two chambers and a toilet-room, a large and a small salon and a dining-room. This latter connects with the kitchen, on the corner of the court, by a butler's pantry. Behind the kitchen come the service-stairs opening on a corridor which gives access to the servants' rooms in the wing. It is a special feature of the plan that all the servants' rooms are on the same floor as the apartment to which they belong. In the right wing there are three chambers and two bath-rooms. All the rooms except the smallest contain fire-places and mantels. These are required by law. The windows are 5 feet wide, doors 2 feet 8 inches or 5 feet. The floors are uniformly of oak laid herring-bone. The rooms are finished in oak with plaster panels tinted, in Louis XVI style, except on the fourth floor. This latter is treated in modern style similar to that of the exterior. The mantels are all of marble, white or gray. The ceilings are of plaster. The service portion is all finished in varnished wood. The rooms are heated by steam; direct-indirect in the main rooms, direct in the smaller rooms. Most of the windows have balconies, the third floor containing the loggia seen in the photograph, from whence we have such a charming outlook over the valley.

The façades of the two top floors set back so as to conform to the laws regulating the alignment of buildings in Paris. The arrangement of these floors is similar to that of the floors below, except that the front rooms become shallower.

The rooms average a little over 11 feet from floor to ceiling.

The attic is suppressed. All the servants' rooms are, as we have seen, on their respective floors. All washing is done outside.

The basement is given over to storage and to the heating-apparatus. The sub-basement is used for wine and vegetable vaults.

Of the plan in general we see that it is quite simple and straightforward; that the rooms are well placed relatively to one another, and that the communication is direct and easy. The apartments let at about $2,400, on the average.

When we come to examine the façade we find something quite radically different from that to which we are accustomed in America. Granted that the window-openings have to come where they do in order to light the rooms properly, as required by the plan, the problem was to make a pleasing ensemble by so disposing bays, balconies, fenestration and loggias as to have an harmonious play of light and shade.

Further variety had to be obtained by the use of several materials of different colors. The base is of a rose-white hard limestone called "Comblanchien." The body of the façade and the trimmings of the upper part are of a buff-white soft limestone called "Pierre de l'Oise." The brick of the lower stories is ordinary red brick. The wall behind the loggia and above is built of a dull enamelled brick, the same color as the limestone. Behind the loggia every sixth course is of a sap-green glazed brick, while behind the tops of the arch imposts are blocks of green and yellow faiënce. The brickwork of the two top floors is also relieved by bands of the same green brick, while directly below the cornice we find a band of red faiënce. The eaves, overhanging by about one foot, are painted yellow. The balcony window and door grilles are of iron painted a light sage olive-green. They consist of small bars of wrought-iron twisted into curves conforming to those of the stone work. The latter is carved only in a few vital points where a play of light and shade is most needed to relieve the monotony of the façade. The carving is mostly in a conventionalized use of the laurel leaf, and the detail of the faiënce is similar in character. The small ventilation openings by the windows and the conductors are frankly but unobtrusively shown on the façade. The curves of the main features are quiet and restrained and usually happy in their lines. They are the result of a great deal of study, for a radically new idea of this sort is far more difficult of treatment than the straightforward work of precedent.

The façade on the court is quite severe in its lines and is built entirely of buff, dull, enameled brick, with buff limestone trimmings. A few red brick bands add a little gaity to the whole. Many window-guard rails add to the cheerfulness. Owing to its plan and the lightness of the walls, the court is anything but somber.

Before ending this description, it might be interesting to look into the construction. The floors are all of reinforced-concrete, of the system known as "Degaine," and are about 12 inches thick. The body of the floor, between 7 inches and 8 inches thick, is of concrete beams with an infilling of cinders, slag, or cork as a deafener. A layer of two-inch tiles, of concrete, on a coarse-meshed woven wire netting is placed above and below these concrete beams, and then a wood floor is laid directly on the upper tiles.

The front wall, of stone and brick, is 18 inches thick; the court wall being 14 inches thick. The partitions are of hollow burned tile about 4 inches thick.

The completed building is a good example of an interesting movement to treat modern problems frankly, freely and sincerely.

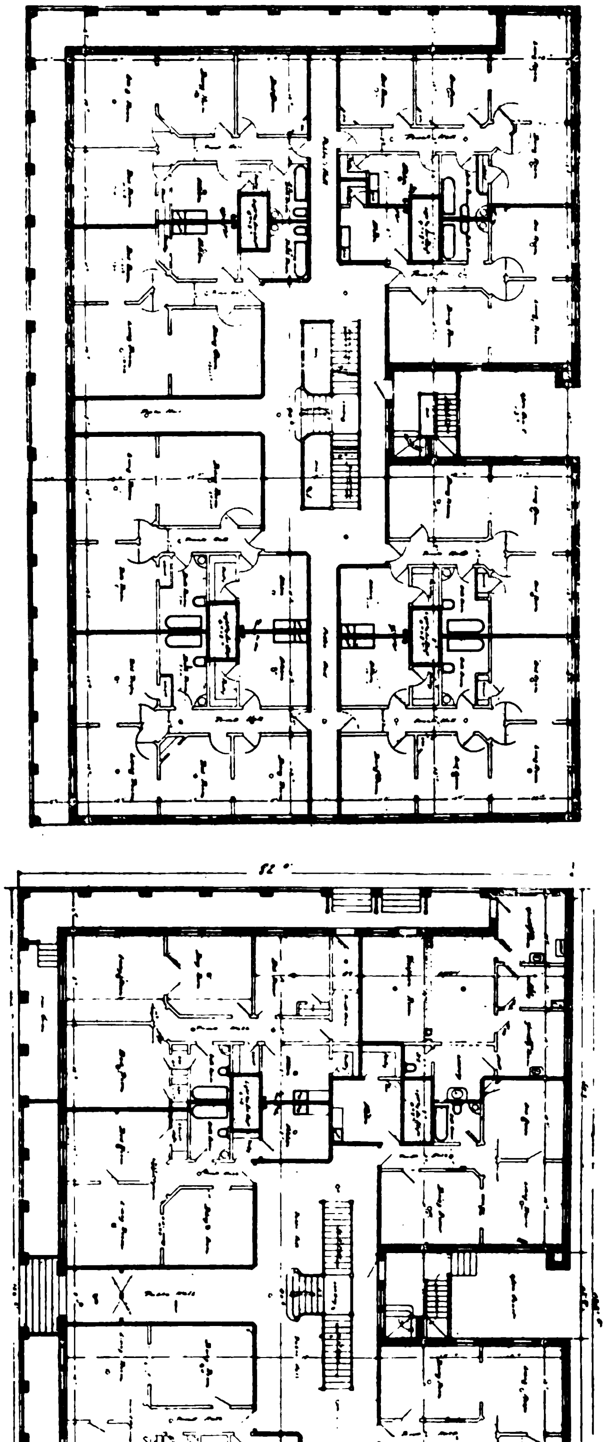
GEORGE B. FORD.

SOUTHERN APARTMENT AND FLAT HOUSES.

THE recent introduction of the apartment or flat house in the South, where it was so long unknown, is an interesting sign of the times, and not unnaturally, in adapting itself to the demands of climate there, it has taken on some new variations that arrest attention. Ten years ago there was hardly an apartment-house to be found south of Washington, D. C. In such cities as Richmond, Nashville, Atlanta, and New Orleans, separate families were supposed to occupy separate houses or rent rooms from others. In Richmond and New Orleans, renting residence property consisted of house built, city-like, in rows abutting on the street. In Nashville and Atlanta renting residence property was largely of the cottage variety, each house differing from its neigh-

bor and set in the midst of separate grounds. The first man who attempted to build a flat in Atlanta was laughed at. "Why build flats," some one asked, "when we have all the room we want for houses?" To-day public sentiment has largely altered.

It was not surprising that the first apartment and flat houses in the South should have been occupied by newcomers from the North, who found in connection with them conditions to which they were accustomed. Gradually, the Southerner himself awoke to the advantages offered, not the least of which is furnace-heat, to the desirability of which Southern builders are just awakening. The first notable apartment-house built in Atlanta was "The Majestic." The lot purchased for its location was just on the outskirts of the business precinct. It cost $15,000, and to-day, after eight years of use, it is worth $50,000. The Majestic has a hotel lobby and a huge dining-room on the first floor. The floors above are all similar to one another, being divided into two, three, four and five room suites, with baths. The two-room suites rent (without board) for $50 and $60 a month, from which the probable price of the others may be reckoned.

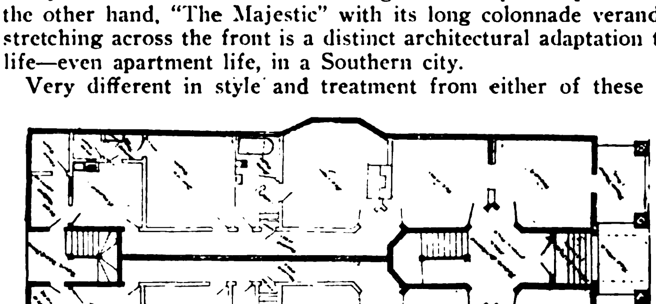


PLANS OF "THE COLUMNS," JACKSONVILLE, FLA. MESSRS. M'CLURE & HOLMES, ARCHITECTS.

"THE VICTORIA," WEST PEACHTREE STREET, JACKSONVILLE, FLA. MR. J. H. SMITH, ARCHITECT.

Unlike "The Majestic," "The Polk," which is recognized as the leading apartment-house of Nashville, is fitted up with appliances for housekeeping. "The Polk" is a monumental structure, set back in large grounds, and in its architectural arrangements it might easily be the work of northern designers, and probably is. On the other hand, "The Majestic" with its long colonnade veranda stretching across the front is a distinct architectural adaptation to life—even apartment life, in a Southern city.

Very different in style and treatment from either of these is



PLAN OF "THE VICTORIA," ATLANTA, GA.

"The Columns," the largest apartment-house of Jacksonville, Fla., McClure & Holmes, architects. Situated on a corner, it has exceptionally good light and air which the architects have not failed to make the most of. The hot climate of Florida necessitates verandas. The architects have given this structure the exterior of a veritable summer hotel, each floor having a promenade around two sides of the building. "The Columns" is of cement plaster with a roof of red tiles. Being only three stories high, no elevator was required. The interior is cut up into apartments of four and five rooms each, the kitchen in every instance being placed rather uncomfortably near the front door—an arrangement which has the advantage of leaving the outside spaces for the

living and sleeping rooms. The Northeast corner of the first floor is reserved as the office and operating-rooms of Dr. Sanderson, the owner.

The large apartment-houses assured success, smaller ones began springing up all over the South; for the average renter was soon eager to enjoy the advantages of heat and service, and the investor was quick to see that to put three, and sometimes four houses, on the land where one house had previously rested was

"THE MENDENHALL APARTMENTS," PEACHTREE STREET, ATLANTA, GA.

an easy and agreeable way to augment his income. On the less important streets in those portions of Southern cities nearest the business section, two-story brick and frame houses, renting for from $20 to $40 per month, have been torn down and replaced by three-story apartment-houses, each section of which rents for from $20 to $40 per month. The advantages are instantly obvious. In Atlanta, in consequence, whole streets of residences during the past two or three years have been replaced by apartment or flat houses.

Considerable originality has been exercised in connection with the smaller flat-houses which in the South are not always of brick, but quite as often clapboarded, or plastered, or shingled. A clapboarded flat-house that is characteristic of Southern work

APARTMENT-HOUSE ON LAURA STREET, JACKSONVILLE, FLA. MR. W. B. CAMP, ARCHITECT.

along this line is the "Leathe Apartments" on West Peachtree street, Atlanta. This building contains three different apartments, each having its own front door and staircase, an arrangement which has proved a successful one from the standpoint of the owner as well as of the renter, in that the former is thereby saved the expense and trouble of lighting and cleaning the halls. Each flat has its own veranda and the occupants enjoy privacy as much as may possibly be done under the circumstances.

"The Victoria," also on West Peachtree street, Atlanta, is a good example of the shingled apartment-house which here is quite successfully combined with gray stone. The house is painted a dark green with a white trim. It was designed and built by its owner, Mr. J. H. Smith. Next to "The Victoria" is "The Jefferson," also owned by Mr. Smith and an exact duplicate of the latter with the exception that it is heated from "The Victoria's" furnace, which was built to accommodate two houses.

The Mendenhall apartments on Peachtree street, Atlanta, are among the most popular and well designed in the city. They are built on a lot that, though level with the street in the front, falls to a depth of thirty or thirty-five feet in the rear. From the front, the Mendenhall apartments are only three stories high. From the rear they are six, the apartments below the street-level having a free and open outlook to the east (Peachtree street being a high ridge of land), and abundant morning sunshine, are used as bachelor apartments.

The separate-entrance idea is carried out elsewhere in the South than in Atlanta. We find it in Jacksonville as a feature of all the smaller apartment-houses. In this city the architects seem to prefer to give the small apartment-houses more the appearance of private residences.

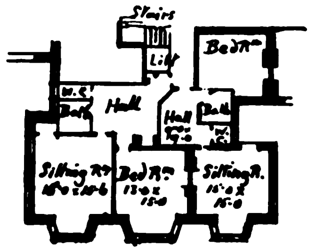
A most unusual variation in the way of an apartment-house is found on Laura street, Jacksonville, W. B. Camp, architect. This building contains three apartments. One occupies one entire side of the building and is two storied. The other side is divided into two apartments, one having five rooms and the other six.

C. S. R. H.

LONDON RESIDENCE FLATS.

MR. PERCY L. MARKS, architect and surveyor, of London England, in a letter to the editors of the *American Architect*, has the following interesting things to say about apartment-houses in London:

FLATS, having come here, mean to stay—to the regret, perhaps, of many people; as the "home" life cannot be so much in evidence as under the old conditions.



Part of a Block of Sets of Chambers in the City of Westminster, London.

Flats near Piccadilly, London

N.B. In these flats, the service is from a common Kitchen, & the tenants are supplied with all domestic service

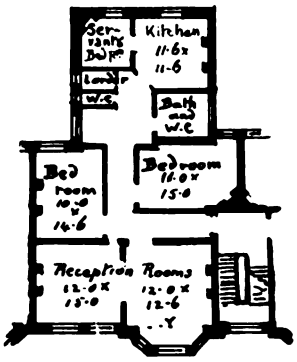
2

We have various types such as "Bachelor," "Family," "Darby and Joan," "Settlement" and "Chamber"; not all these names are of general acceptation, but they serve to indicate the types.

The "Bachelor" flat will ordinarily consist of a sitting-room, bed-room, bath-room, etc., with entrance-hall or passage. The sitting-room should contain a cupboard ventilated to the outer

air, suitable for use as a larder, and there should be a hanging and shelf cupboard in the bed-room. At times we meet with combined bed-and-sitting-room, but it is not to be recommended; this latter arrangement is more usual in collegiate "residences" and in "settlements" in the metropolis, and in such cases there will be a common dining-hall—this is the type designated above as the "Settlement."

The "Chamber" type is more of a development of the "Bachelor" suite, but there is not much distinction. The most usual types are the "Darby and Joan" and "Family," the accommodations of which vary from sitting-room, bed-room, and domestic office of a simple character, to a suite of reception-rooms and bedrooms multitudinous, with the addition of servants' quarters. Respecting these domestic residences



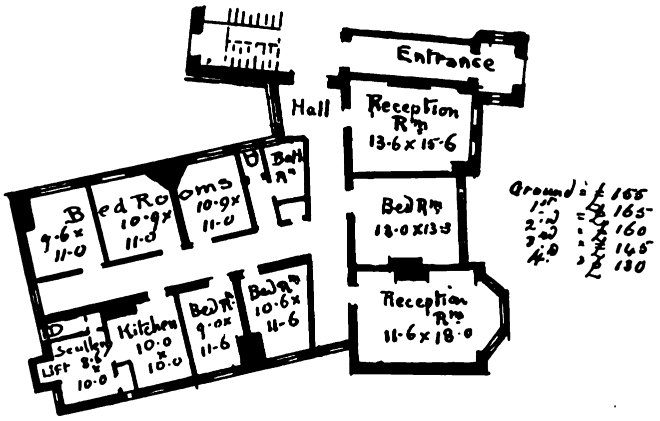
District of Brondesbury, London.

Rough sketch of above

there are sub-types —(a) the self-contained, (b) the scattered, (c) the service, and (d) the maisonette. To dispose, first, of the last mentioned: the maisonnette is not a flat, being a self-contained suite of apartments dispersed over two or three stories; it is very popular in some of the better districts.

The self-contained flat is all on one level and is *ipso facto* economical because minimizing the requirements of domestic help; of this sub-type is the flat suitable for a newly married couple or for a couple "without encumbrances."

The scattered flat is one in which each tenant's requirements are

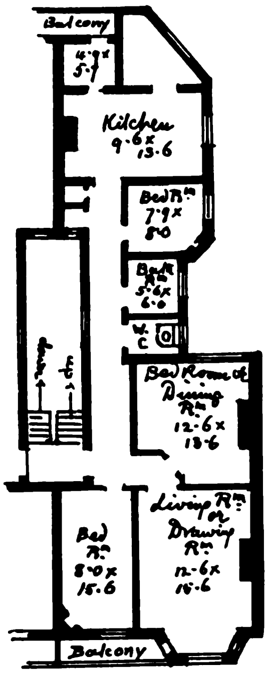


all on one level, but the servants' accommodations are provided either in the basement or the top story.

The service type is one for which the landlord provides all domestic service and cuisine, the latter preferably at a fixed tariff. Rentals of these vary very considerably, dependent not so much perhaps upon accommodation as upon situation, though, of course, accommodation is a factor. From £45 to £200 per annum are rentals that meet with plenty of demand here. But it must be borne in mind that these and higher rentals are inclusive of rates and taxes and—very frequently include the use of a lift with the convenience of a porter who can receive messages.

In the Maida Vale district, plenty of small flats can be obtained at rentals of from £45 to £80; but rentals are (sometimes very much) higher in districts such as West or South Kensington, Piccadilly or Park Lane. It is, however, possible without much difficulty to obtain a thoroughly comfortable flat in a nice neighborhood for about £70. Against most of the sketch plans I place the rentals obtained at the time they were built a few years ago; but I believe somewhat lower rentals are ruling now.

District of Maida Vale, London



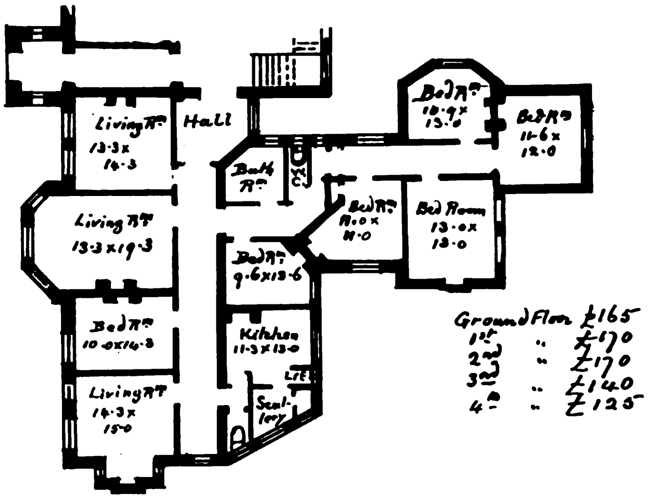
Front.

Flat between £40 and £50 p.a

A great point in the planning of flats is to make the best use of the space at disposal, avoiding unnecessary passageways, though a good entrance hall is a desirable feature. In avoiding passages it is, of course, very important that one room should not be the sole means of communication with another. Passages should not be less than 3 ft. 6 in. wide.

Flats should be, as they are not always, well lighted and ventilated. To depend on artificial light is a mistake, though "borrowed" lighting is not objectionable where "direct" lighting fails.

The average height for rooms is ten feet, but even at an extra outlay, it is desirable to keep the entrance-hall, if small, and the passages about eight feet high only, by the use of a false ceiling. It is usual for tradesmen to deliver their goods in the basement, and the delivery to each flat is, in such cases, by "goods-lift." In high blocks escape-stairs are a necessary provision; they should be readily accessible.



District of West Kensington, London

Of course, blocks of flats should not only be fire-proof (not merely fire-resisting), but also sound-proof; what is more worrying than to hear a neighbor's gramophone or pianola, amongst other noises.

The following may be regarded in typical dimensions:

Entrance-hall, 8x10 to 14x18.

Drawing-room, 12x15, upwards.

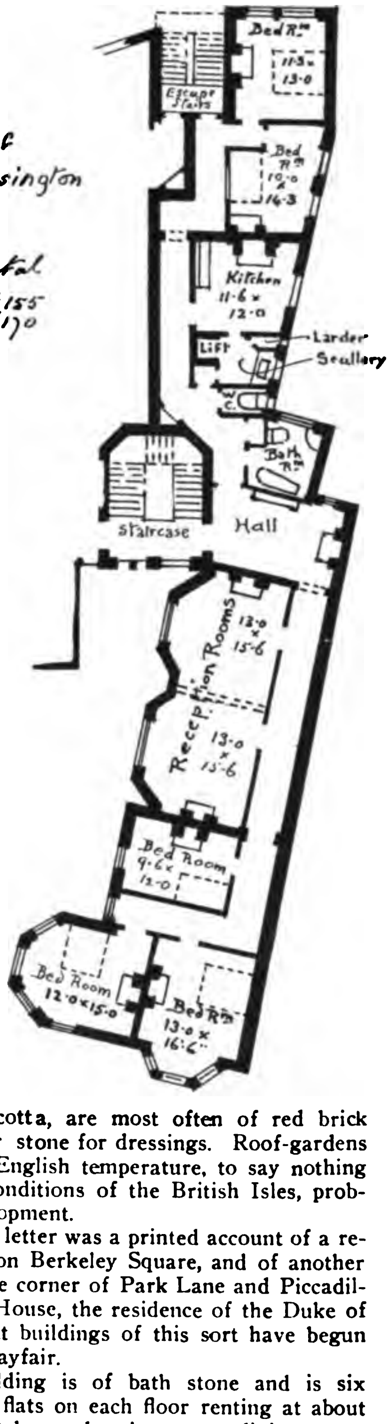
Dining-room, 12x13, upwards.

Kitchen, 9x12, upwards.
Principal bedroom, 10x15, upwards.
Other bedrooms, 9x11, upwards.

The sites available are often responsible for the planning of very odd-shaped rooms; but these might, with care, be very much improved. Cupboards should be provided in every flat and, where "false ceilings" are used above halls, the space between

District of
West Kensington
London

Annual Rental
Ground - £150/£155
1st - £165 & £170
2nd - £165
3rd - £145
4th - £130



these and the true ceiling might well be used for storage space, made accessible by means of a short ladder. The bath-rooms may contain not only a bath-tub and lavatory basin, but also the water closet apparatus; as not only is there medical warrant for its advisability, but it enables one to make more use of such space as is available. A separate water-closet should be provided for servants.

The accompanying sketch plans and elevations are typical. Bay-windows are a common feature, as also are oriel - windows in cases where the ground floor is utilized for shops. The sky line is frequently broken up by gables of varying contour. The façades. sometimes of stone or of terra-cotta, are most often of red brick with either gauged brick or stone for dressings. Roof-gardens are not much in vogue, the English temperature, to say nothing of the normal atmospheric conditions of the British Isles, probably not favoring their development.

Accompanying Mr. Marks's letter was a printed account of a recently built apartment-house on Berkeley Square, and of another now under construction on the corner of Park Lane and Piccadilly, on the site of Gloucester House, the residence of the Duke of Cambridge—thus proving that buildings of this sort have begun to invade even fashionable Mayfair.

The Berkeley Square building is of bath stone and is six stories high. There are two flats on each floor renting at about £1.000 a year each. Each flat has a drawing-room, dining-room, hall, four bed-rooms and two bath-rooms with servants' quarters, consisting of kitchen, scullery, larders and pantry, at the rear. Hot water for heating, baths and kitchen is laid on throughout the building. Elevators are installed, one for the use of tenants, and one in the rear for servants and tradesmen. The top floor is occupied by the housekeeper and his family, and has a maid-servant's room for each flat. In the basement are storerooms, etc., and rooms for man-servants.

The Park Lane building, Messrs. Collcutt and Hamp, architects, is expected to be ready next June. It is a steel-frame structure with brick filling, faced with an eggshell finish terra-cotta of old ivory color. The fifth and sixth stories are in a Mansard roof covered with green Spanish tiles. The ground floor will be occupied by a bank and the flats above it will rent for about $2,000 a year. This will not be thought a high rental by one accustomed to New York prices when it is understood that each flat occupies a whole floor of a building on a site measuring 52 feet by 230 feet. The ceilings are to be 15 feet 6 inches high. Each flat has its own vestibule entrance measuring 20 feet by 8 feet 6 inches, with a cloak-room adjoining. The inner hall is 32 feet by 16 feet; the drawing-room 40 feet by 20 feet; the dining-room 30 feet by 23 feet; billiard-room 24 feet 6 inches by 19 feet 6 inches; boudoir 24 feet by 18 feet 6 inches. Sliding doors are so arranged that a ball-room nearly 70 feet long may be made available by opening the doors between the principal reception rooms. There are ten spacious bed-rooms and three bath-rooms apart from the servants' quarters, which include servants' hall, housekeeper's room, butlers' rooms, kitchen, scullery, larders, etc. Floors and partitions are made fireproof and soundproof. From the white marble entrance-hall on the ground floor a staircase ascends to the top of the building. And in this staircase well two elevators are installed. The rooms are equipped with electric radiators, as well as open fireplaces for heating. It is interesting to compare these $10,000 London flats with the $15.000 flats at Fiftieth Street and Fifth Avenue, New York, illustrations of which are shown elsewhere in this issue.

APARTMENT-HOUSES IN MONTREAL, CANADA.

MONTREAL is the only Canadian city in which apartment-houses are at all common. The great prevalence of French blood in its inhabitants, as well as the size and compactness of the city, easily account for this. Quite a number of apartment-houses of high class have, however, recently been erected there or are now under construction. The largest of these is "The Linton," Plate 20, Messrs. Finley & Spence, architects, situated on Sherbrooke Street, at the corner of Simpson Street.

The building has been set back from Sherbrooke Street about twenty-five feet, giving ample space for a driveway which will lead under a large bronze and glass porte cochère. The Sherbrooke and Simpson Street façades of the building will be of granite and terra-cotta, ten stories high. The main entrance is from Sherbrooke Street, and leads into a spacious vestibule and entrance-hall. Passing through the entrance-hall, a wide corridor leads directly to the elevators. On the right-hand side of this corridor is a large and lofty lounging and reception room. The corner of Sherbrooke and Simpson Street, on the ground floor, is occupied by the café, which will easily accommodate one hundred and fifty guests. It is the intention of the owners to make the café as attractive as possible from every point of view. The room lends itself to a treatment of decoration which will be most effective. The walls, up to the ceiling, which is over twenty feet high, will be paneled and handsomely decorated.

Owing to the sharp rise of the ground on Simpson Street only the front half of the ground floor has been made use of for the café, lounging-room, etc., and two suites of apartments.

The upper floors of the building consist of suites of apartments of from two to ten rooms, the large suites having two bath-rooms. The housekeeping suites are provided with kitchen and pantry, while a certain number are arranged without kitchen for those who do not wish to take their meals in their own apartments. There are no "inside" rooms, but every chamber has direct outside light, air and view. In the basement provision has been made for bath-rooms for the use of the servants throughout the building.

A part of the top floor of the building has been divided into single bedrooms with bath-rooms. These rooms are primarily at the disposal of tenants who may require at any time greater bedroom accommodation than is offered by their own apartments.

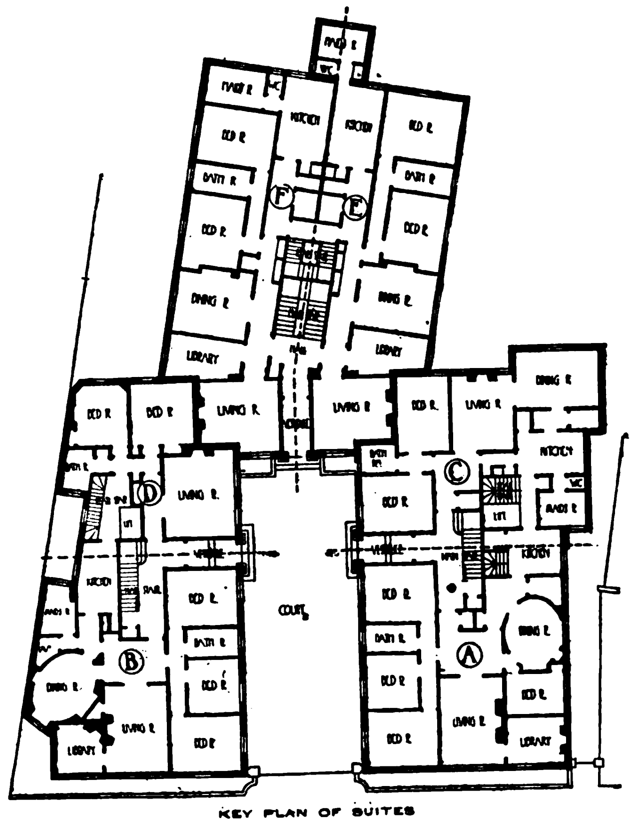
The plans show a large billiard and smoking room, and also a ladies' tea-room on the top floor, the privileges of which will be for the sole use of tenants and their guests.

Apartments will be furnished with electric-light fixtures, telephones and gas-stoves, cold-storage refrigerator-service, and all the conveniences which it is possible to procure for the tenants. No expense has been spared in the selection of these furnishings, and they will be in keeping with the general surroundings of the building. There will also be two high-speed elevators giving a service day and night.

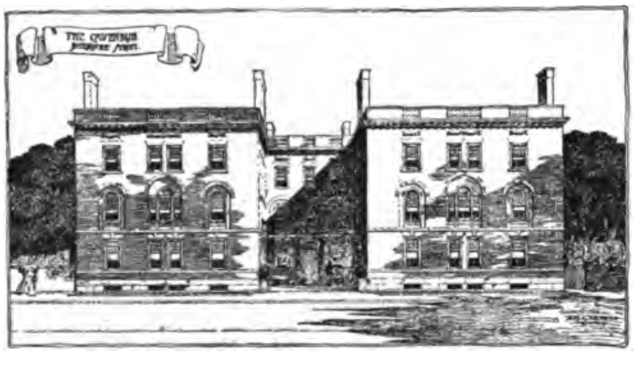
Adjoining the café is a large private banquet-room. The main entrance to the café is from Sherbrooke Street, with another

entrance from Simpson Street. The Simpson Street entrance is especially intended for the use of ladies. To the left of this entrance is a large reception-room, ladies' retiring-room, lavatories, etc. On the ground floor, adjoining the main entrance, there have also been provided telephone-booths, cloak-rooms, etc., for the use of the tenants and patrons of the café.

The building, which has been designed with the aim of making it as fireproof and soundproof as is possible with modern construction, is constructed entirely of steel and incombustible materials, the floors being twelve inches thick and fireproof. All partitions throughout the building will be of brick, even those



KEY PLAN OF SUITES



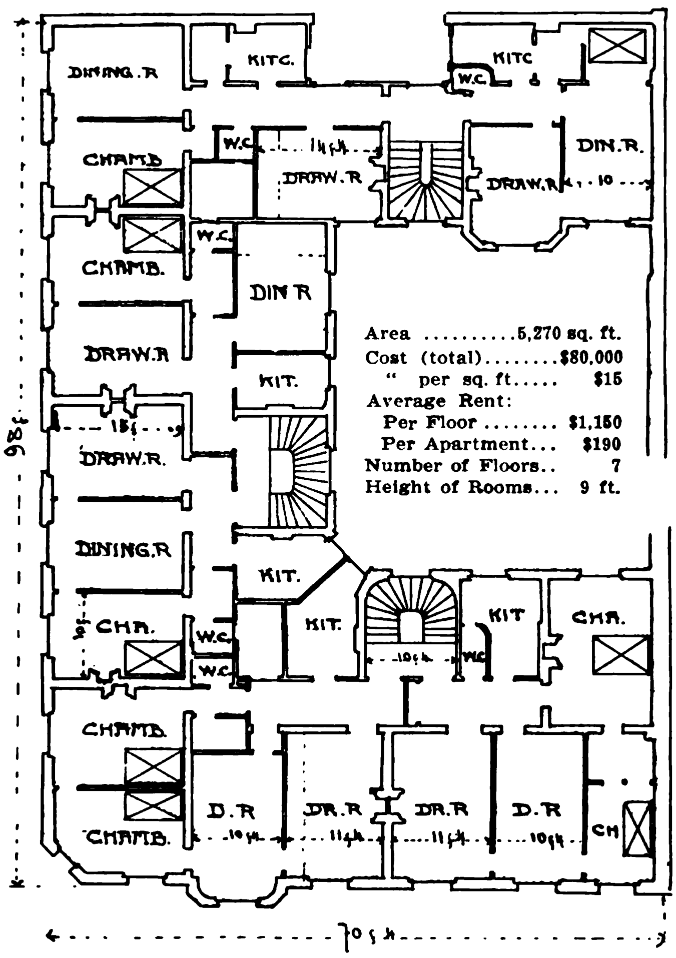
"THE CAVENDISH," SHERBROOKE STREET, MONTREAL, CANADA.

between rooms of the same suite. The building will thus be absolutely fireproof, and this construction at the same time precludes the possibility of noises penetrating from one apartment to another. This has been found a source of great annoyance in many of the apartment-houses in Montreal and elsewhere.

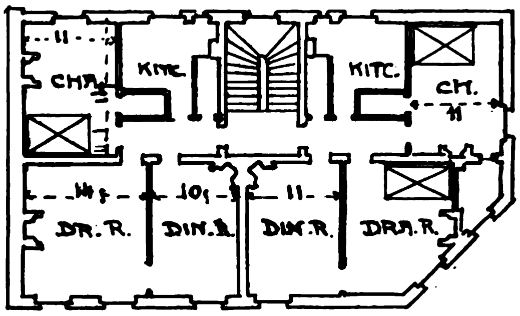
The main entrance-hall and corridor will be wainscoted with marble to a height of ten feet with mosaic work. All the public corridors and halls throughout the building will have mosaic floors and marble skirting. Hardwood floors will be laid over concrete in the different suites throughout the building. The dining-rooms will have hardwood finish and beamed ceilings. The main staircase will be of wrought-iron and marble and entirely fireproof.

On the same select residential street there is now under construction an apartment-house of very different character—one whose aspect both without and within is homelike rather than hotellike. This is the "Cavendish," Messrs. Saxe & Archibald, architects. The arrangement of the floors has been carefully studied, and the architects have succeeded in avoiding long, narrow passages and in so laying out the rooms that the principal ones may be thrown together for entertaining while the bedrooms are grouped on a separate corridor in such a way that the occupants may pass from one sleeping-room to any other without being on view from any of the reception rooms. Other excellent features may be observed from an examination of the plan, which is worthy of careful study. The equipment of this building, like that of the "Linton," is thoroughly modern, among the improvements to be provided being an incinerator for the destruction of garbage.

SOME PARISIAN APARTMENT-HOUSES.

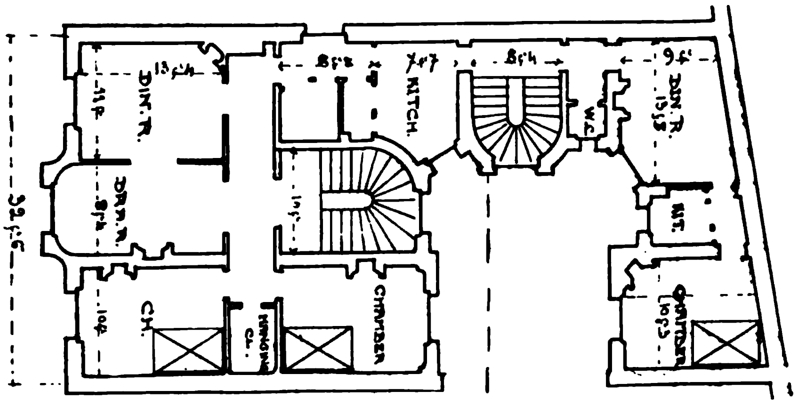


RUE SAINTE-CROIX-DE-LA-BRETONNERIE. A. SIBIEN, ARCHITECT.

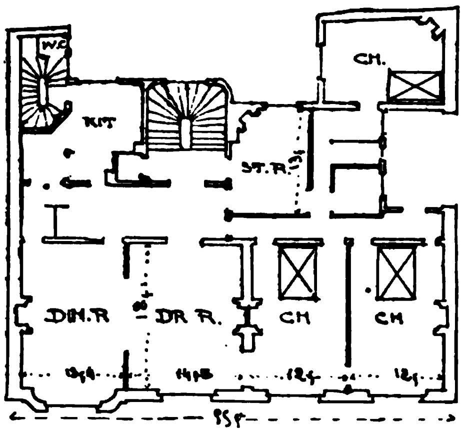


Area, 1,568 sq. ft.
Cost:
Total, $18,000.
Per sq. ft., $11.
Average Rent:
Per floor, $450.
Per Apartment, $225.
Number of Floors, 4.
Height of Stories, 10 ft.

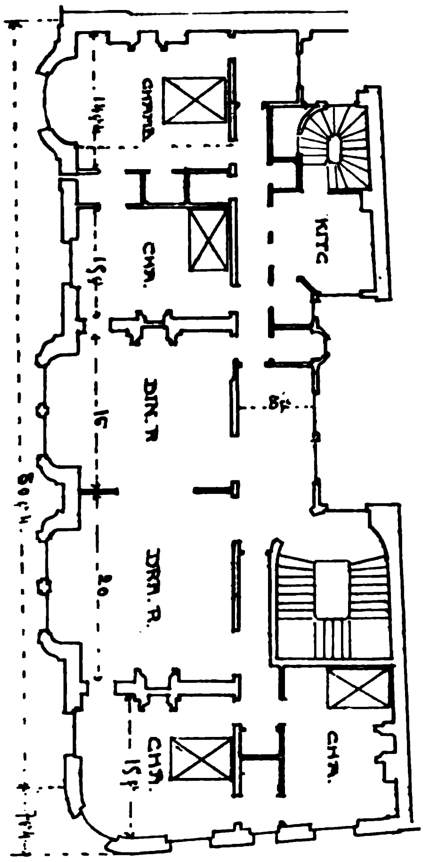
RUE DE PARIS, MEUDON. E. HARAUT, ARCHITECT.



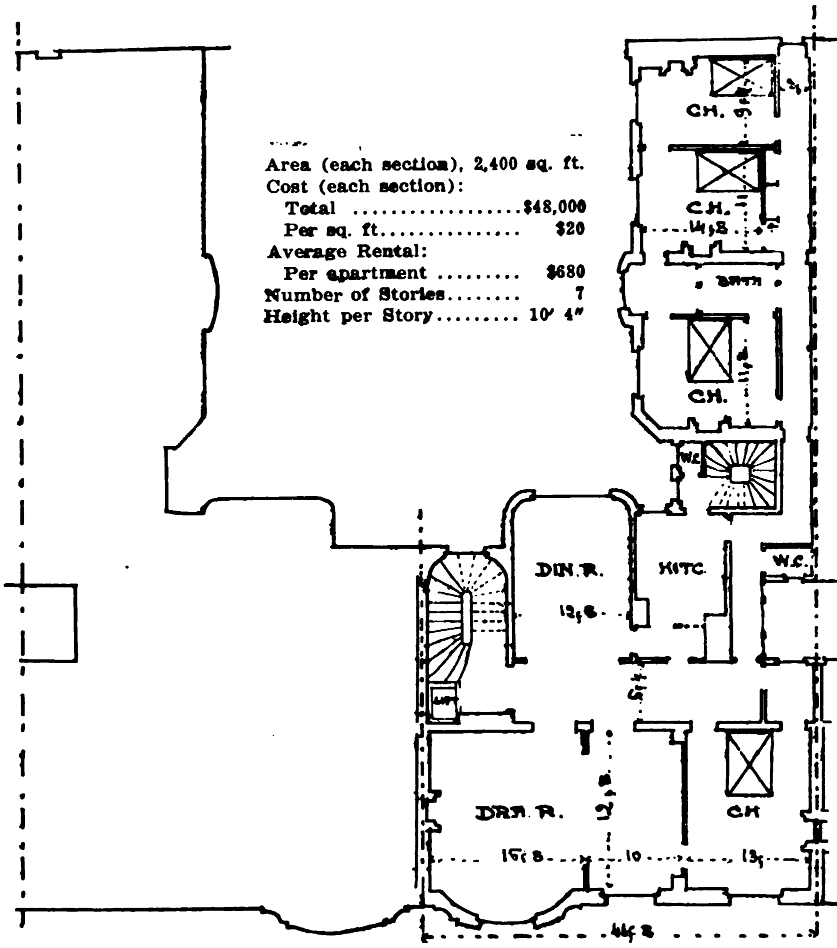
53 RUE TRUFFAULT. L. P. MARQUET, ARCHITECT.
Area, 1,591 sq. ft. Cost: (total), $25,000; (per sq. ft.), $15. Average Rental: (per floor), $360; (per apartment), $120 and $250. Floors, 7. Height of stories, 9′ 4″.



AVE. ALPHAND. THEO. PETIT, ARCHITECT.

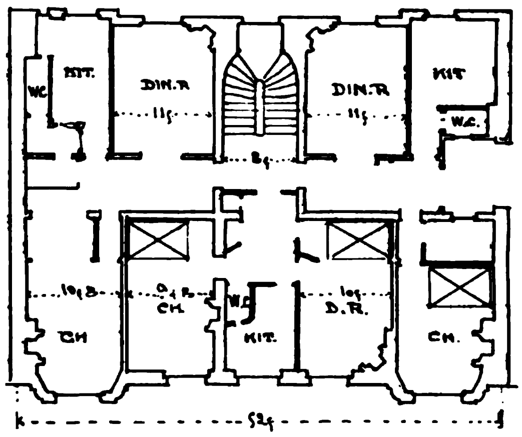


BOULEVARD BEAUBOURG. A. WALWEIN, ARCHITECT.
Area, 16,125 sq. ft. Cost: (total), $60,800; (per sq. ft.), $30. Average Rental (per apartment), $850.

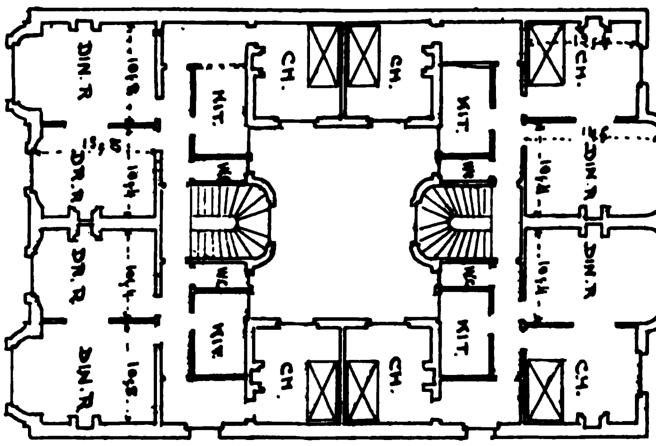


Area (each section), 2,400 sq. ft.	
Cost (each section):	
Total	$48,000
Per sq. ft.	$20
Average Rental:	
Per apartment	$680
Number of Stories	7
Height per Story	10′ 4″

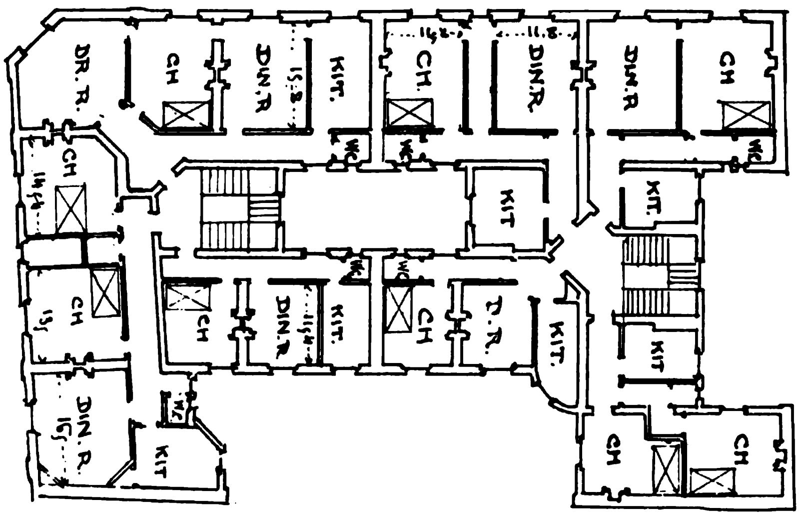
BOULEVARD PEREIRE (HALF PLAN). A. LE VOISVENEL, ARCHITECT.



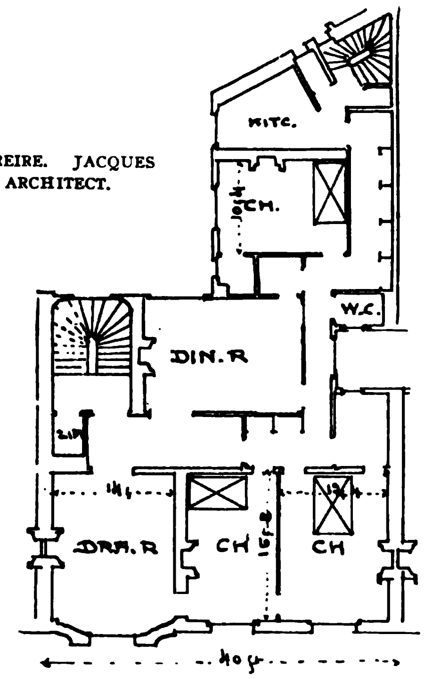
127 RUE LAMARCK. A. VERDONNET, ARCHITECT.
Area, 2,472 sq. ft. Cost, $24,000. Average Rental: (per floor), $350; (per apartment), $120.



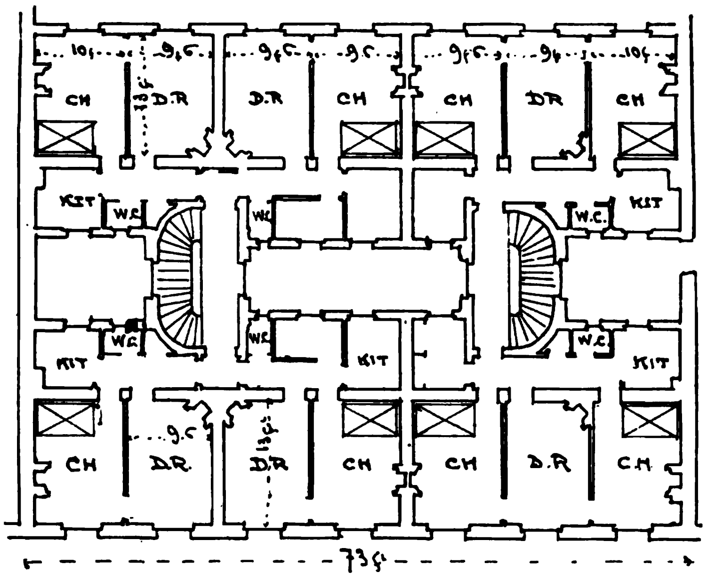
RUE DU CHEMIN VERT. CH. LARBO, ARCHITECT.
Area, 2,690 sq. ft. Cost (total), $41,300; (per sq. ft.), $15. Average Rental (per floor), $580; (per apartment), $145.



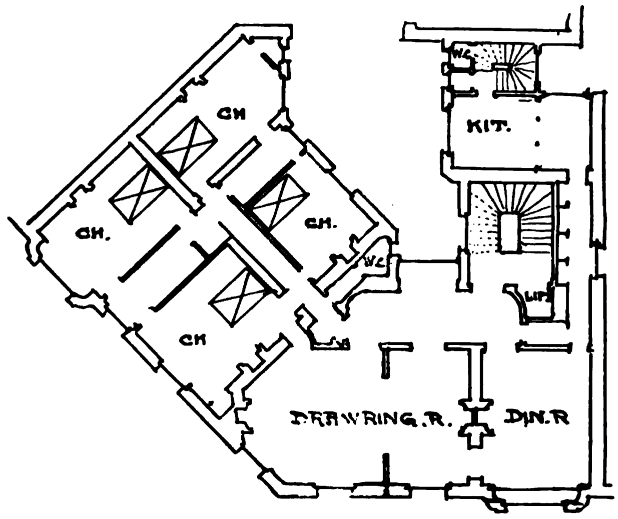
RUE VAUGIRARD. EMILE BERTRAND, ARCHITECT.
Area, 4,386 sq. ft. Cost (total), $68,000; (per sq. ft.), $16. Average Rental (per floor), $850; (per apartment), $120. Floors, 8. Height of Stories, 11′ 0″.



BOULEVARD PEREIRE. JACQUES HERMANT, ARCHITECT.



RUE FONDARY. E. WAGRET, ARCHITECT.
Area, 3,848 sq. ft. Cost (total), $44,200; (per sq. ft.), $12.50. Average Rental (per floor), $630; (per apartment), $105. Floors, 7. Height of Stories, 9′ 0″.

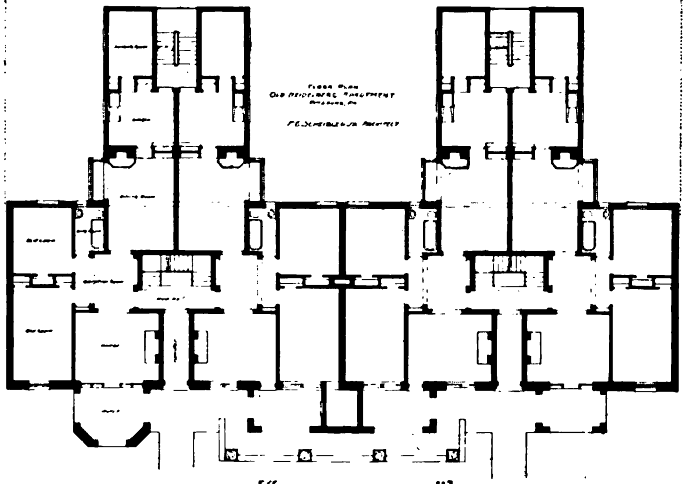


RUE PELOUSE. G. RIVES, ARCHITECT.
Area, 3,225 sq. ft. Cost (total), $67,000; (per sq. ft.), $20. Average Rental (per apartment), $11. Floors, 6.

ILLUSTRATIONS.

APARTMENT-HOUSES, I. II.: "IVANHOE COURT," BOSTON, MASS. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

For description, see article elsewhere in this issue.



["OLD HEIDELBERG."]

APARTMENT-HOUSES, III.: "OLD HEIDELBERG," WILKINSBURG, PA. MR. F. G. SCHEIBLER, JR., ARCHITECT, PITTSBURGH, PA.

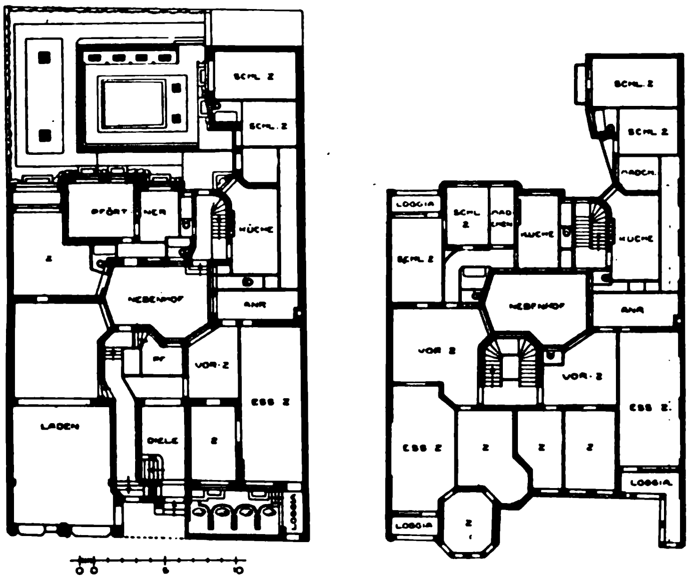
We understand that this building, of which the design so evidently draws its inspiration from the Art Nouveau movement as it is understood in Germany, is carried out in reinforced-concrete.

APARTMENT-HOUSES, IV.: "THE APTHORPE," BROADWAY, 78TH, 79TH STS. AND WEST END AVE., NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.

It is a matter of much regret that the owners of this building, the superstructure of which has but just begun, are unwilling to have displayed at this juncture the very interesting arrangement of suites that the architects have devised. Our readers must be content to know that just as the building is the largest and most expensive, so it is probably the best devised apartment-house in the city.

APARTMENT-HOUSES, V., VI.: NO. 2, NIEHBURSTRASSE, CHARLOTTENBURG, PRUSSIA. HERR ALBERT GESSNER, ARCHITECT.

These plates, which are copied from *Blätter für Architektur*, show a rather interesting and unusually discreet rendering of the German phase of the Art Nouveau. The plan, which shows a certain ingenuity of arrangement, is rather a curiosity, in that all sorts of unnecessary breaks and offsets have been introduced with, seemingly, entire disregard of the bearing that such wantonness has on the labor-cost.



II. und III. Stockwerk.

[HOUSE AT CHARLOTTENBURG.]

APARTMENT-HOUSES, VII., VIII., IX.: APARTMENT-HOUSE ON THE RUE DE LA TASSE, PARIS, FRANCE. M. L. SOREL, ARCHITECT.

For description, see article elsewhere in this issue.

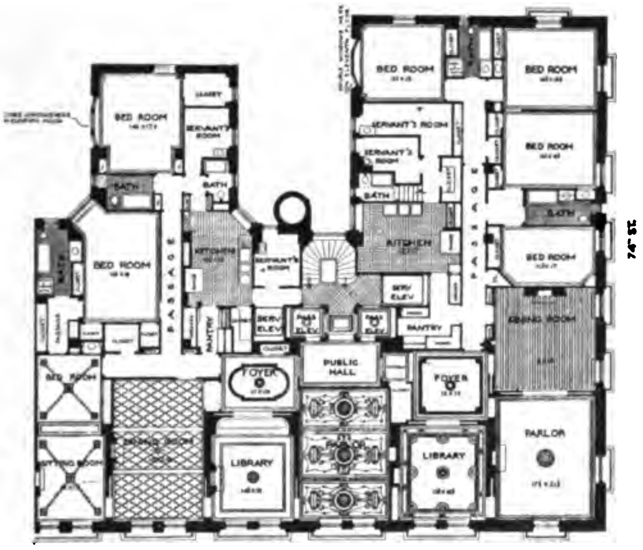
APARTMENT-HOUSES, X.: APARTMENT-HOUSE ON WEST 72D STREET, NEW YORK, N. Y. MR. JOHN E. SCHARSMITH, ARCHITECT, NEW YORK, N. Y.

APARTMENT-HOUSES, XI., XII.: FLAT-DWELLINGS, COR. GRANT AVE. AND KENNETT ST., PITTSBURGH, PA. MESSRS. MILLIGAN & WEBBER, ARCHITECTS, PHILADELPHIA, PA.

APARTMENT-HOUSES, XIII., XIV.: APARTMENT-HOUSE, COR. EAST 60TH ST. AND FIFTH AVE., NEW YORK, N. Y. MR. H. J. HARDENBERGH, ARCHITECT, NEW YORK, N. Y.

Apartments in this building rent at from $15,000 and upwards per year.

APARTMENT-HOUSES, XV., XVI.: "THE LANGHAM," WEST 73RD ST. AND CENTRAL PARK, WEST, NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.



CENTRAL PARK WEST

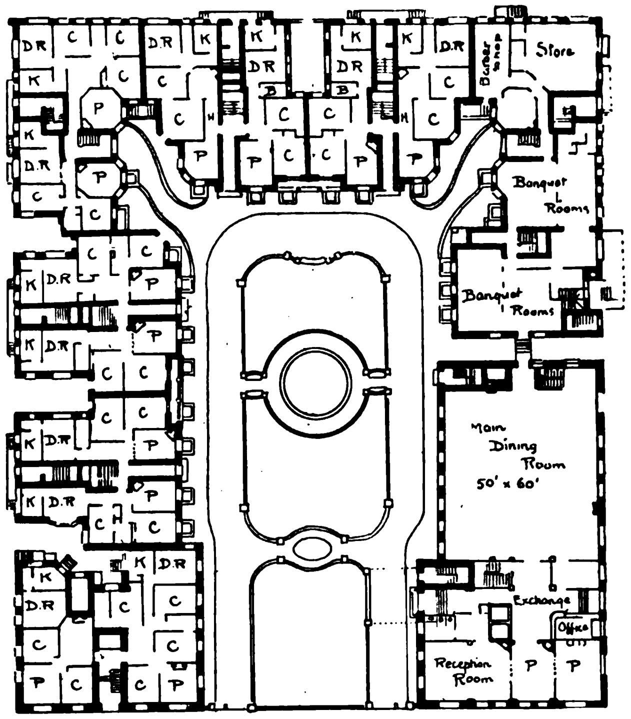
APARTMENT-HOUSES, XVII., XVIII.: "HAMILTON COURT," 39TH AND CHESTNUT STREETS, PHILADELPHIA, PA. MESSRS. MILLIGAN & WEBBER, ARCHITECTS, PHILADELPHIA, PA.

Because of lack of space, we do not show general views of this interesting group of buildings, but they can be found in our issue for October 21, 1905. The treatment is unusual since the owners desired to provide accommodation for transient custom as well as for permanent tenants. The architects have, therefore, provided in the right wing of the group an isolated building equipped and furnished as a hotel of the quiet and select type.

APARTMENT-HOUSES, XIX.: "THE COLUMNS," JACKSONVILLE, FLA. MESSRS. M'CLURE & HOLMES, ARCHITECTS.

A description of this building, which is also known as the "Sanderson Flats," since it was built for and owned by Dr. San-

[TYPICAL PLAN: "HAMILTON COURT."]



[GROUND FLOOR: "HAMILTON COURT."]

derson, may be found in the article on "Southern Apartment-houses" elsewhere in this issue.

APARTMENT-HOUSES, XX.: "THE LINTON," SHERBROOKE ST., MONTREAL, CANADA. MESSRS. FINLEY & SPENCE, ARCHITECTS, MONTREAL. P. Q.

A description of this building may be found in the article "Apartment-houses in Montreal, Canada," elsewhere in this issue.

APARTMENT-HOUSES, XXI., XXII.: SIXTY-SEVENTH STREET. ATELIER BUILDING, NEW YORK, N. Y. MESSRS. B. HUSTACE SIMONSON AND POLLARD & STEINAM, ASSOCIATED ARCHITECTS, NEW YORK, N. Y.

For the accommodation of the artistic fraternity, whether bachelors or benedicts, there is coming into fashion a very attractive class of studio buildings, in which the two-story studio on the north frontage is combined with a mezzanine or gallery treatment at the southern end, the mezzanine floor being given over to bedrooms, etc., for the artist and his family, if he have one, while the space below, on the main floor, provides liberally for dining-room, kitchen and domestics. As it is not possible to get a satisfactory view of the entire front of this building, as the street is a narrow one, we give only a view of the entrance, which gives a sufficient indication of the architectural character, and to it adjoin a view of the entrance to the next building, which is of the same type and designed by the same architects.

APARTMENT-HOUSES, XXIII.: "THE SORENTO," WASHINGTON, D. C. MR. ARTHUR B. HEATON, ARCHITECT, WASHINGTON, D. C.

Until within a few years Washington has been a city almost

ENTRANCE FRONT OF "THE SORENTO."

exclusively of independent houses, either isolated or in blocks, but recently owners have taken to building apartment-houses, this view showing a particularly successful treatment of the smaller type.

APARTMENT-HOUSES, XXIV.: "THE HIGHLANDS," CONNECTICUT AVE., WASHINGTON, D. C. MR. ARTHUR B. HEATON, ARCHITECT, WASHINGTON, D. C.

"The Highlands," located on Connecticut Avenue—Washington's most fashionable boulevard—at the corner of California Avenue, is good in many respects, its great elevation enabling one

LOBBY IN "THE HIGHLANDS."

to obtain an unobstructed view over the city as well as the adjacent country—even Fort Washington on the lower Potomac being distinctly visible. It offers its guests every convenience of a first-class modern hotel, in conjunction with the restful quietude and exclusiveness of a private residence. The equipment is thoroughly modern in every respect, embracing electric elevators of the newest and most approved type, local and long-distance telephone service in every apartment, electric-light plant, refrigerating and filtration systems, night-watchmen's clock system, mail-chutes, etc. The best and most modern plumbing is used throughout the building, bath-rooms being equipped with every conceivable convenience.

The decorative schemes in the lobby, public parlors, café, etc., are very elaborate, marbles and hard woods being extensively used. Apartments contain from two to seven rooms, and bath, but larger suites are available if desired. Apartments of seven rooms or more may be had with or without kitchen. Furnished suites are also obtainable. The rental price includes steam heat, electric lights, ice water and hall-boy service.

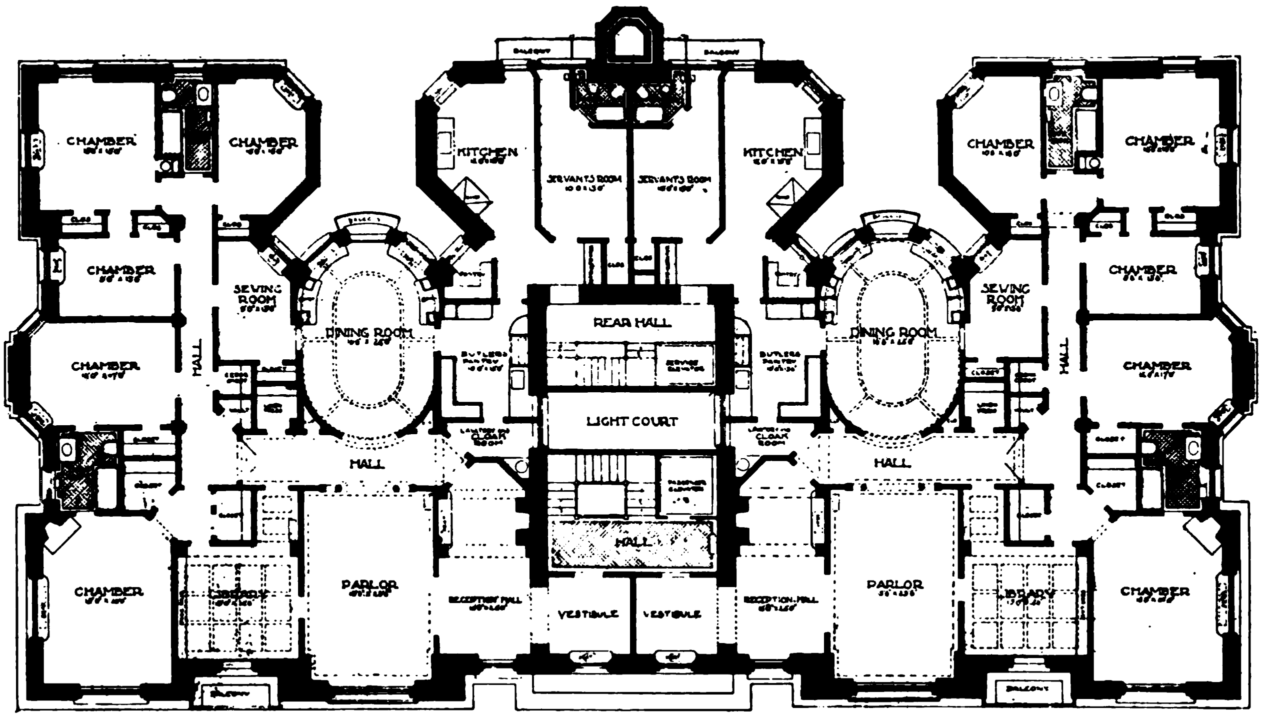
NOTES AND CLIPPINGS

An Art Scandal.—A lawsuit reveals a bit of scandal in artistic circles. It is disclosed by the evidence that Mme. Thérèse Humbert, the adventuress, anxious to obtain fame for her husband, Frédéric Humbert, in his career as a painter, promised $20,000 to M. Roybet, the well-known master colorist, if he would help Humbert paint a picture that should figure in the Salon of 1890. This was done, and the picture, entitled "Louis Treize and Mlle. de Hautefort," was signed by Frédéric Humbert, although painted by Roybet, and received a third-class medal from the jury of the Salon. But Mme. Thérèse Humbert never paid the promised $20,000. At the Humbert sale the picture fetched $1,200. The purchaser, a dealer named Danthon, learning the facts, went to Roybet, asking him to cut the canvas in two, calling one "A Court Benediction" and the other "A Cardinal Awaiting Louis XIII." This was done, and the two pictures

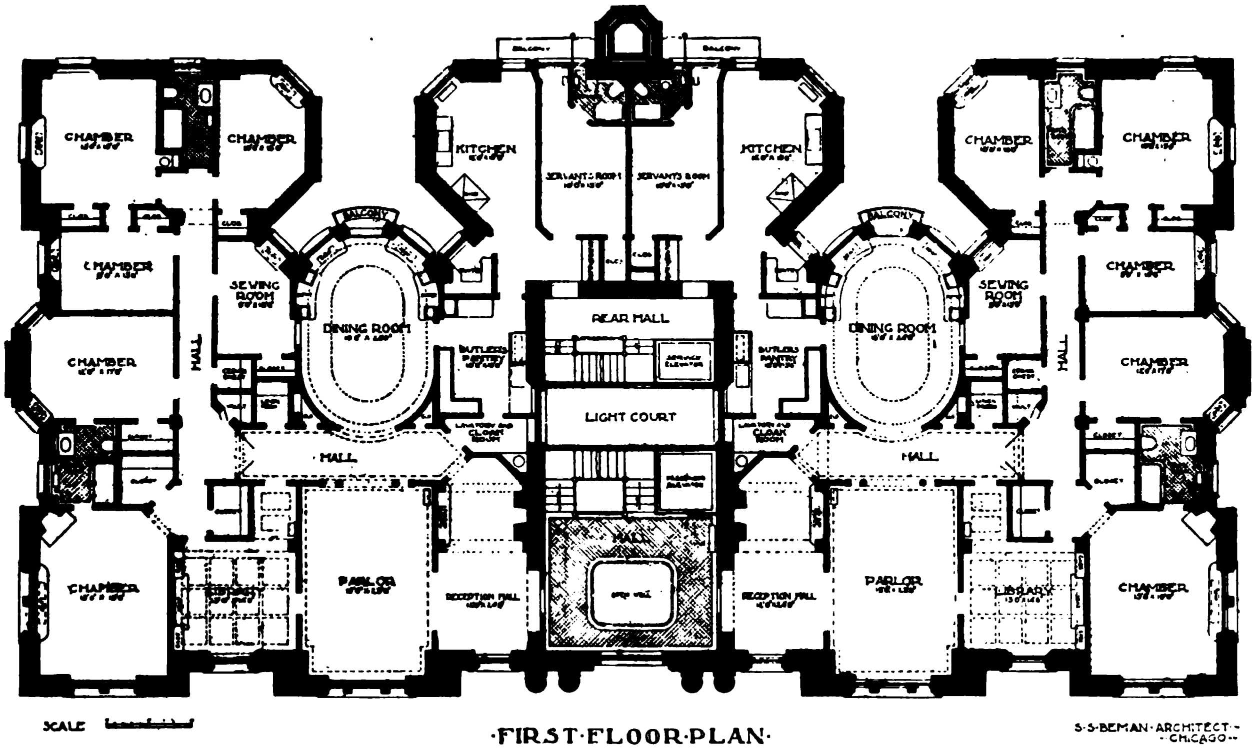
were sold to an amateur, M. Viguier, for $22,000, but M. Viguier, hearing the true story of the pictures, brought a lawsuit, the evidence in which led to the foregoing significant disclosures.—"*C. I. B.*" *in N. Y. Tribune.*

ACADEMICIANS ACCOUNTED FOR.—Bad artists are always nice people. I never met a thoroughly inferior painter who was not irresistible socially. This accounts for some of the elections at

Company, of New York, for the building of a chimney which will not only be the tallest of its kind in the world, but will be excelled in height only by the Washington Monument and the Eiffel Tower. It will have a height of 506 feet. About five million bricks will be used in its construction, as against 2,300,000 in the famed Anaconda or Sister smelter stack. The cost will be $200,000. It will carry off the noxious smelter fumes.—*N. Y. Tribune.*



·2ND 3RD AND 4TH·FLOOR·PLAN·



SCALE

·FIRST·FLOOR·PLAN·

S·S·BEMAN·ARCHITECT·
·CHICAGO·

PLANS OF THE BRYSON APARTMENT-HOUSE, 4932 LAKE AVENUE, CHICAGO, ILL. S. S. BEMAN, ARCHITECT.

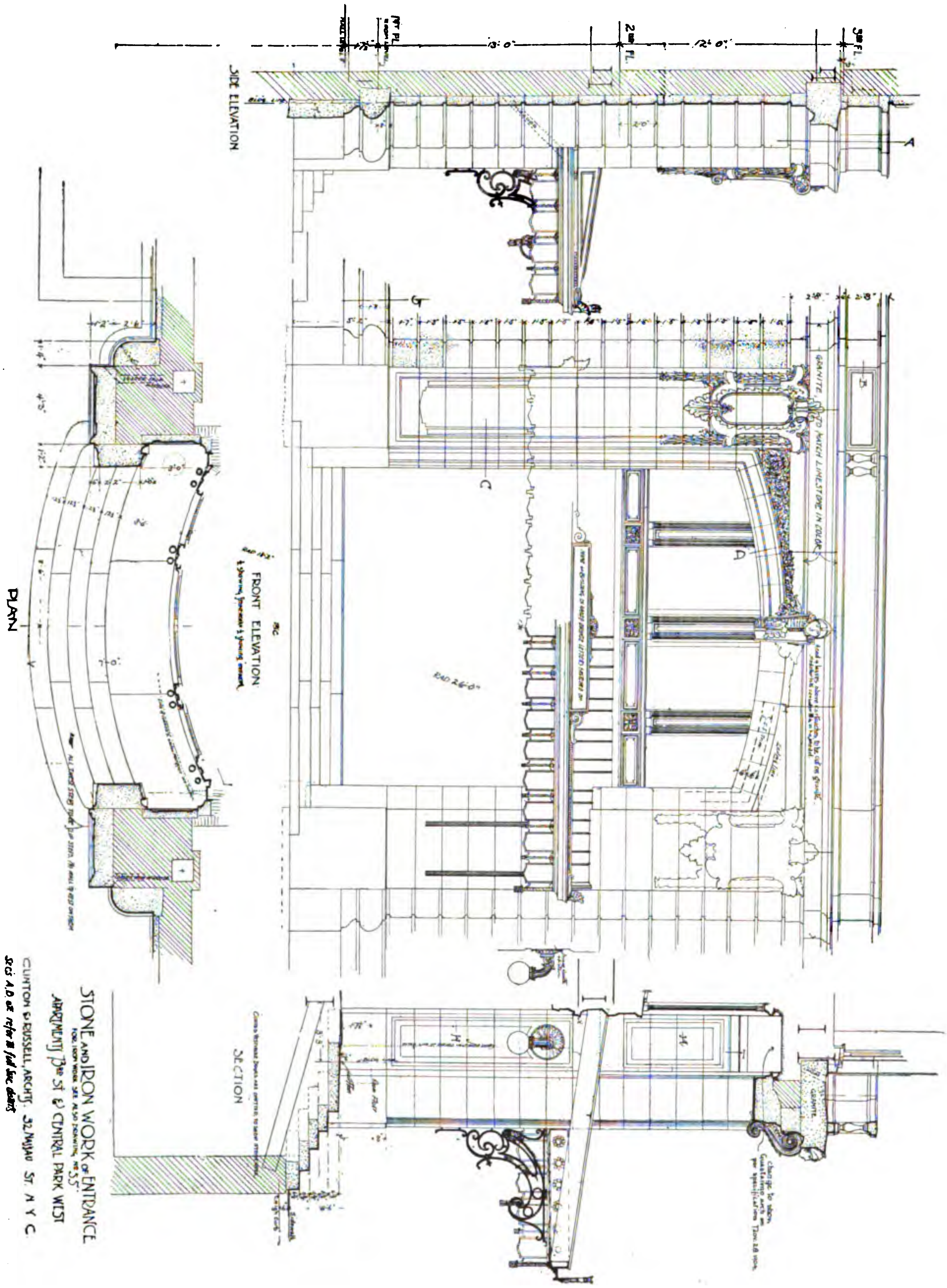
[A view of the exterior of this building, which cost $400,000, and whose apartments rent at $2,000 to $3,600 per year, may be found on page xxxiii.]

the Royal Academy, I believe, and for the pictures on the walls of your friends.—*The Academy.*

THE TALLEST CHIMNEY IN THE WORLD.—The Boston and Montana, a constituent of the Amalgamated Copper Company, December 21 awarded a contract to the Alphons Custodi Chimney

A PRISON PALACE.—The King of Portugal is probably the only monarch in Christendom who has established his favorite abode in a prison. The royal seaside residence at Cascaes, near the mouth of the Tagus, was built and used as a penitentiary, until one day the father of the present King happened by mere chance to stumble upon it, on a blazing hot summer's day.

Struck by the delicious coolness of the prison and by the aspect of health of the convicts, he resolved that it was altogether too good for them, and just what he wanted for himself. So he turned the prisoners out and converted the penitentiary into a royal residence, where the royal family takes up its abode throughout the summer months.—*Marquise de Fontenoy in N. Y. Tribune.*



Cost of Some American Buildings.—The Hall of Records was begun almost ten years ago. The land on which it stands cost $1,841,553. The building itself, including decorations, furniture and maintenance, has cost, so far, $6,144,613,373. The interest on these sums and the rent of quarters for the offices now housed in the building (a rent to be calculated as abnormal expense during the last five years) approximate a grand total of $10,000,000, according to the Comptroller.

The Broad Exchange Building, the largest office-building in the world, cost $5,500,000. The Park Row Building, the tallest office-building in the world—thirty-two stories high—with its 990 offices, was ready for occupancy in one year from the laying of its foundations, at a cost of $2,750,000.

The Trinity Building, twenty-one stories in height, with its 500 rooms, was ready for occupancy in a year, at a cost of $2,750,000. —*The Broadway.*

The American Architect and Building News.

Vol. XCI. SATURDAY, JANUARY 12, 1907. No. 1620.

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JUDGE HOSMER, in the Supreme Court of California, on Saturday last, rendered a decision which would have suited Portia without question, and it isn't easy to see why it is not as good law as that which Shylock had to bow to. Seemingly, the decision upholds the validity of the famous "earthquake clause" in the insurance policies, where used, and this, of course, must be highly satisfactory to the insurance companies, for it is the one point they have been most anxious to maintain, since it would relieve them, seemingly, from paying a considerable number of losses where the fire broke out in the débris of earthquake-wrecked buildings. But Judge Hosmer, however, makes it plain that, in each case, the burden of proof rests on the insurer and not on the insured, and this will not be at all satisfactory to the insurance companies; for, given the case of a building that was swallowed up in the general conflagration, even with the protection of the exempting "earthquake clause," the insurers must pay the loss in full, unless to the satisfaction of a jury—and a local jury, at that—they can prove that the fire actually entered the building through some rent or crevice made by the earthquake. The insurance companies, very unjustly, have been made the butts of much vindictive, and of still more foolish, writing in newspapers everywhere, but it is our feeling that no chapter in the financial history of the country can be found that reflects greater credit on our financiers than is disclosed by the California disaster. It seems almost unbelievable that so vast a loss, entailing the sudden conversion of large amounts of securities into cash, should not have produced financial ruin all through the country.

WE are glad to do what we can to promote the comfort and welfare of American students sojourning in Paris, by publishing the American Art Association's appeal for funds that may be found in another column. We do not think the committee has placed the stress of its appeal at quite the proper point. There is not so much need of a fully-equipped club-house, lest its attractiveness may draw students away from their proper work in the ateliers; but there is the greatest need that whatever establishment can be provided shall be properly endowed, so that students, who are quite as likely to be desperately poor as to be in a position to disregard the cost of any luxury, may not be debarred from joining the Association and sharing in its advantages because of the high rate of entrance-fees and annual dues. The lot of the impecunious student in Paris is already sufficiently hard, and it should be the effort not to add to it the heart-burning due to finding himself shut out from an American club-house because he cannot afford to pay large fees. Such a club, to be of the greatest service, should be in no sense exclusive, but, on the contrary, should be absolutely democratic, and the only way it can be made such is to secure for it an adequate endowment.

WE still believe there was good sense in the recommendation we proffered to draughtsmen a few weeks ago to the effect that there was propriety in keeping their employers' secrets, although, judging from a news-item in a Western paper, there seems a possibility that now and again an over-zealous draughtsman may succeed in keeping his employer's secrets only too tenaciously. Mr. J. W. Stevens, of St. Paul, seems to have encountered lately service of this ultra secretive kind, and, as a consequence, has been obliged to sue out a writ of replevin which he hopes will enable him to recover from an elusive draughtsman once in his employ a number of negatives and drawings. As the value of the missing material is set at five hundred dollars only, and as amongst the drawings are listed some relating to the proposed high-school in Cincinnati, the new educational building at Albany, and a number of private houses scattered about the country, it is clear that in no case was an entire set of drawings abstracted, and the explanation must be that the draughtsman picked out those particular drawings which he himself had chanced to make and carried them off so that they might be exhibited to his next employer as samples of his skill. As the greenest of bookkeepers could hardly believe he had a right to abstract the account-books he had chanced to fill out with his handwriting

and figuring, one is rather at a loss for a proper color-term to apply to this extremely unsophisticated youth, who fancied he could set up a right in his employer's drawings because not his employer but himself had made them.

IF any one will stop to consider the matter, we think he will find that there are few callings of a commercial character that so incite to intellectual growth as that which is cultivated, so imperfectly—in the majority of cases—by "real-estate men," be they brokers, owners or speculators. For this reason we think the attempt making by the Young Men's Christian Association in a few of the larger cities to maintain "courses in real estate" is one that deserves not only watching but active encouragement. The true expert in real estate, the man who uses his intelligence as other professional men use theirs, finds there is vastly more to his work than the mere selling of land and buildings at a profit over purchase price, as if it were any other commodity. There is this difference at least: other commodities waste and are consumed, while land, at least, endures forever, and its possibilities of yielding a return are as various as the men who through the ages may turn their attention to it. Little as we know of real-estate men, we can perceive that they should have a fair legal education, so that they may do their own conveyancing, search titles and be able to give a safe answer to the ordinary run of legal questions clients are sure to propound. To this must be added a real knowledge of the general land laws of the country and State, and a profound knowledge of all special laws and ordinances affecting the locality where they practise. The care of improved property requires a fair knowledge of building construction and a thorough acquaintance with local building ordinances, while the improving of property demands, on the one hand, some knowledge of surveying, engineering and landscape architecture and, on the other hand, a familiarity with the economic laws that govern the use of capital and a close acquaintance with the workings of loans, mortgages and taxes. The thorough real-estate man should have a strong, but not too vivid, imagination and the broadest knowledge of the trend of business everywhere and of all kinds as it affects the growth and expansion of a community. There are so many directions towards which the intellectual effort of the real-estate man can be directed that it seems curious that some of the universities have not founded chairs for its development, instead of leaving it to the rather elementary fostering of the Y. M. C. A.

JUST as it is a matter of perennial dispute who was the youngest recruit to enroll in the Union Army during the Civil War, so it seems to be equally difficult to decide who is the rightful claimant of the honor of erecting the earliest fireproof building. The Philadelphia *Public Ledger*, a usually well-informed newspaper, makes the very sweeping assertion that "the first fireproof buildings ever erected" were designed by Mr. Robert P. Cammerer, an architect who died, last week, in Philadelphia in his seventy-eighth year. Unfortunately, no intimation is given as to where or what these early fireproof buildings are or may have been; but, presumably, as Mr. Cammerer, who was born and educated in Germany, practised his profession in Philadelphia for thirty-two years, these doubtless interesting buildings should be looked for somewhere in that city.

THE long-drawn-out litigation over the Westminster Chambers seems to have been brought at last to a definite and final stopping-place by the Massachusetts Superior Court denying, last week, the City of Boston's motion for a new trial. The time for filing exceptions has expired, and it is said there is now no means of reviving the litigation, and so Boston must pay as damages to the owners of the building $301,588 and to the contractors $40,721.94. It has all been a very expensive lesson—which, we hope, may profit the rising generation—that affirms the fact that the Commonwealth of Massachusetts, at least, intends that its laws shall be respected and observed by the wealthy as much as by the poor. It has been really a three-cornered battle, and, as usual, the public—the man on the street—is the party who really gets the worst of it, for not only he has to provide, indirectly, the money the city will now have to pay out in damages, but he has to endure the sight of the defaced upper story of the building which makes a plague-spot on the face of Boston's chiefest centre of architectural interest.

ONCE more a jury at the École des Beaux-Arts has been unable to award the Prix de Reconnaissance Américaine, and has had to content itself with awarding five "accessits" to the authors of the most deserving designs, based on a programme which called for the treatment of a lighthouse in New York Harbor. This year twenty-one competitors submitted *rendus*, a rather larger number, we believe, than has been of recent years attracted by the opportunity. While it is disappointing that this prize has not achieved a greater popularity, it is very gratifying to find the authorities acting their part conscientiously, and by the strictness of their rulings doing all that they can to maintain the significance of this prize: it would be too disheartening to have it cheapened through indifference on the part of the jury. Perhaps, in time, the Society of Beaux-Arts Architects may succeed in persuading the French authorities to allow the winning of the American prize to count amongst the mile-stones that mark the road to Rome, in the same way that the French prizes count.

IT has not seemed desirable to delay the publication of this issue for the sake of including in it any account of the convention at Washington this week. It is enough to say that the occasion proved to be all that the promoters hoped to make it, the "jubilee" and festive character of the proceedings being sufficiently pronounced, while yet leaving sufficient time for the giving of proper consideration to the serious routine business of an annual meeting. Next week we shall, without undertaking to report the proceedings in full, give some account of the more important incidents, speeches, and discussions that marked the convention.

THE AMERICAN ART ASSOCIATION, PARIS.

IN the year 1890 there was an absolute demand for an organization in Paris that should meet two quite imperative needs. One was a house for the American student and artist. He lived in comparative isolation, often under conditions of great discomfort, and deprived of access to journals, reviews and current literature in his own language. He was largely restricted for companionship and social intercourse to public places which lacked everything that was homelike, and which imposed for their use a considerable burden of expense. The other need was the protection and furtherance of American Art and the consolidation of its interests. Paris was recognized and was being used as a great School of Art. American students and artists were separated units. Bound together in an organization, their national character could be better maintained and their influence be greatly increased when circumstances might call for its exercise.

On the 12th day of May, 1890, a number of students and artists met at No. 131, Boulevard du Montparnasse, in response to an invitation from Mr. A. A. Anderson, an American artist, who had been a student in Paris. Mr. Anderson's experience had demonstrated the needs referred to above and he had determined to meet them. He had found at this address an old rambling house with a garden. The house had been made comfortable, homelike, and attractive; the garden had been cleared and put in order. Mr. Anderson briefly stated to those assembled that the house (of which he held a nine years' lease) and its contents were theirs to use. The result of the meeting was a decision not only to enjoy but also to help this gift. Mr. Anderson was made President. A Secretary and Treasurer were chosen and also an Advisory Board of eighteen.

At the second meeting held on the 17th day of May, 1890, the name "American Students' Association" was adopted. In the absence of a Constitution the Association was declared to be for the mutual benefit of all American students in Paris, and that it was exclusively for men.

In March, 1891, the number of members on the roll was 270.

The name of the club at this date appears as "The American Artists' Association," which later, in 1892, was modified under the present title, "The American Art Association."

Early in 1896 it was decided to look for new quarters, as the home of the club was soon to be demolished in order to make room for the erection of apartment-houses that now occupy its former site. On March 22d, 1897, it was formally voted to move to No. 13, Quai de Conti. One motive of this move was the hope that the closer contact with the "Rive Droite" would bring into the Association members whose sympathy with art would prompt them to seek the fellowship of artists and art students. The interesting and historic house, known as the Petit Hôtel de Conti, between the Institut de France and the Hôtel des Monnaies, became the new hearth and home of the Association. Two floors were acquired and comfortably arranged.

The new quarters were formally opened with an entertainment on the Fourth of July, 1897. During the sojourn of the Club on the Quai de Conti, three noteworthy exhibitions of Painting, Sculpture, and Architecture were held. Generous prizes, offered by Mr. John Wanamaker and by Senator Clark, were competed for.

The experience of the Association's sojourn on the Quai de Conti proved two important points: first, that to attract to the Association those who would be ranked as interested in Art, the question of locality was of no force; secondly, that for those who were to find the Association a benefit to them—for the students—the question of locality was supreme. The Quai de Conti had proved to be an impracticable situation. But few joined to fill the places of old members who were constantly leaving for home. These reasons prompted a return to the centre of the student community: the Montparnasse quarter. A house at No. 74, Rue Notre-Dame-des-Champs, with a very large studio in it fell vacant. An adjoining building on the Rue de la Grande-Chaumière with two large studios, belonging to the same proprietor, also becoming available: the whole was leased from October, 1902, and in the course of a brief period was adapted to the uses of the Association and became its new home. The wisdom of this move was speedily justified by the scores of members who rapidly swelled the roll.

The formal opening of this new club-house occurred on the evening of December 13th, 1902. The rooms were crowded with new and old friends of the Association, and with its members. The hope then entertained that a new career of usefulness and success had been begun, has been fully justified by experience since this date.

With this brief *résumé* of the Association's history, we may ask what are the lessons of its past?

The undoubted usefulness of the Association to the student community is generally recognized.

The impossibility of self-support has been continuously and conclusively proved. The solution of the problem of maintenance has been found in personal effort on the part of members and through the generosity of a limited number of patrons. It is perfectly certain that for generations to come the appeal of art to our country's youth will remain as imperative as it is to-day, and it will doubtless gain in force. It is as genuine an appeal as that of any other profession. How much has been done all over our land for students in law, medicine, science, theology, and the liberal arts generally! The fine arts are entering more and more into the life and work of the nation. The best architecture, inner decoration, landscape gardening, gold and silver work, glass making, ceramics, all these, the dependent features of the fine arts, are in great demand. No less urgent is the claim for the best in painting, sculpture, engraving, music, literature, and languages. The answer to these demands and claims should come from our own youth. All kinds of productive effort at home have been stimulated and helped. Have we done our duty to art? Ought not students in this wide field that contributes so largely to the charm and pleasure of life and elevates to a higher standard of civilization, to be so encouraged, that the results of their work shall be better, and better worth the buying, just as we have helped the doctor, the lawyer, the engineer, and others, so that their labor is more worthy its price.

The American Art Association, of Paris, has proved itself to be a real and valuable factor in producing better results in art study and work, and in upholding moral principles of life. It should be so firmly established that its usefulness may be perpetuated, and its influence in the direction of a truer and higher national art increased and enlarged.

For these reasons, the present appeal and effort are made. Superior as the present quarters are to former homes of the Association, they are still far from meeting its needs.

The exhibition gallery and the room used as a restaurant are too small. There is no one room adequate for a lecture or important function. There is no place for a gymnasium, and baths are lacking. The plumbing and sanitary arrangements are anything but satisfactory, and no improvement can be made except at the expense of the Association and by taking a very long and unfavorable lease.

Those who are interested in, and who have worked earnestly for, the American Art Association feel more and more that its home and its provisions are inadequate to meet the requirements of the large American student community of Paris, and that it fails lamentably to express here in Paris, the interest that our art lovers and promoters of education in America are manifesting in art and education, and that it is quite unworthy of our great country. A well-equipped and partially endowed institution is what America should insist upon and give to its students in Paris, so that their work should be furthered, their lives dignified and brightened, and their love of country kept fresh and vigorous by the tangible realization in their midst, in a foreign land, of their country's generous thought for them, as well as its sympathy in their aims and efforts.

Hence the accompanying statement is offered for the careful consideration of Americans who hold education in high esteem, and who recognize in art an elevating and refining influence that should have as wide a sway as is possible over our people and land.

Annually about 1,000 American young men are studying in Paris: Painting, sculpture, architecture, music, vocal and instrumental; French language, and other subjects.

The French Government is lavishly generous to American students. Invaluable privileges are given free or for an exceedingly small cost.

These students need a homelike centre for rest, recreation, physical culture, a club-house that embodies as its features: library, reading-rooms, restaurant and café, billiard-rooms, gymnasium and baths, gallery for exhibitions of works of art, hall for lectures, and reunions.

Since its formation in 1890, the American Art Association has offered in a very modest, though useful proportion, some of the above advantages, thanks to the deep interest and generosity of a few persons.

The present condition of the Association is quite inadequate to meet worthily and fully the requirements of this large student community, and the inevitable financial problem is most difficult

to solve under the present circumstances. It is also keenly felt that the present limited institution is not at all what America should show as compared with what France is doing for our young men.

The Association needs $300,000, of which: $75,000 for land; $100,000 for building and equipment; $125,000 for endowment.

The home of the Association should be in the centre of the American student community, which is permanently fixed in the Montparnasse quarter of Paris. The junction of the Boulevards Montparnasse and Raspail forms the centre of a circle which, with a mile radius, comprehends 4-5 of the students.

Messrs. Morgan, Harjes & Co., 31, Boulevard Haussmann, Paris, France, are the bankers of the American Art Association, and subscriptions should be forwarded to them.

Any special information will be furnished by the Secretary of the Association, 74, Rue Notre-Dame-des-Champs, Paris.

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A METHOD FOR RETONING THE NATURAL TINTS OF STONES AND MARBLES.

IT has been fonud by experiments and observation that many of the colored stones and marbles used in architectural work, especially in the northern climates and districts, where there is a phenomenal rainfall, are subject to deterioration in color or tinting, by a system of carbonization, and in some rare cases by oxidation. Many attempts have been made in consequence, by experts, to overcome this evil, and also to revivify this color or tinting, some of which may be said most decidedly to have been successful. The great object in all these experiments has been to nullify the action of the acid which works upon the mineral producing the color in the stone, and so prevent the change of one compound into another. In nearly every case this has been effected by using a basic compound composed of sulphate of lime and lime water, and then treating the stone with a solution of the metallic salt which produces the color or tint shown in the rock or stone. There are, however, other systems which will be dealt with in the course of this article. During the primary observations it was noticed that after heavy rain-storms a decided loss of color or tinting was produced, particularly in stone where there was no free lime. If, however, a very small quantity of free lime remained, the coloration remained fresh and clear for a much longer period. Experiments were therefore made with lime-water of varying strengths, according to the following scale:

1. The ordinary drinking water of about sixteen degrees hardness, or half an ounce of lime to the gallon.

2. Rain-water, into which had been introduced one-third by weight of quick-lime.

3. Ordinary river water, into which an equal quantity by weight of quick-lime had been introduced.

4. Rain-water, containing also an equal quantity by weight of lime.

5. Ordinary drinking-water, to which had been added sufficient quick-lime to make an equal weight.

These lime waters were placed in properly prepared tanks, and sulphate of lime was then added and allowed to remain until saturation had taken place, when the solutions were drawn off into other tanks, the stones to be experimented upon being then introduced, and allowed to remain until saturation had also occurred here. At the end of this time the stones were withdrawn, and it was then found that all the colors possessing an iron basis were as fresh and as brilliant as when taken from the quarries, and that although those possessing other metallic bases showed evident signs of the preservative qualities of the lime in solution, yet some toning agent was still further needed. From this it was considered as proved that the lime possessed an undeniably preservative action, and that the explanation of the phenomenon was the following: There ought not to be really any action produced by the water alone upon the stone, without the presence of a third body, and this third body was shown to be present in the form of carbonic acid. Now, when this gas comes into contact with the lime water, a combination is immediately brought about, thanks to the great affinity of the two, and a neutralization of the active properties of the gas is effected, thus preventing the deterioration of the tone and color, and so, consequently, preserving both the beauty and the value of the stone. Before proceeding any further it may be as well to consider the composition of many of the veins and spots found in the different stones and marbles. One of the principal materials is found in that compound known as dolomite or magnesian limestone, as for example in that well-known marble, the Porto Venere, or, as it is more popularly called, Black and Gold. In this instance, the magnesia has been introduced under the natural form of sulphate of magnesia. Another great factor in the veining, and also in the production of the different colors and tones, is the oxide of manganese, which, upon admixture at a proper temperature, namely, that of boiling-point, which is generally considered as being the most suitable, colorations or tints, varying, according to the chemical strength of the oxide from pink, rose-pink, up through violet and purple, are produced. Next in point of importance comes the oxide of iron, this being in fact one of the chief chemical substances used by nature in producing her works of art. These oxides comprise:

1. Limonite, or Hydrous Oxide of Iron—producing a brown or brownish-yellow color.

2. Protoxide of Iron—producing a range of color, varying from blue to grey.

3. Sesquioxide or Red Oxide of Iron—producing the various tints of red.

Two carbonates are also found in nature, namely, the Green Carbonate of Copper, whence an apple or emerald green is produced, and the Carbonate of Iron, producing tones varying from blue to grey. Taking these facts into consideration, it was deemed probable that with proper treatment of the stone with these chemical matters, a revivification or toning of the colors in the stone might be effected, and upon experiment this method was found to be successful. The stone was in every instance allowed to stand in lime-water, prepared in the manner described above, sulphate of lime being added to saturation, except in the case of those stones which were found to contain large quantities of magnesia, as in the Dolomitic Rocks, or in the Black and Gold Marbles. In this case, the sulphate of lime was replaced by the sulphate of magnesia. After the stone had been standing for the prescribed time it was removed and immediately treated with a solution of the metallic salt required to produce the coloration, these metallic salts being naturally so made up in solution as to give varying strengths, and so produce the desired effect. For instance, when using the green carbonate of copper—a solution of one to twenty-five was employed in retoning a light or apple green, whereas a solution of one to ten was made use of when dealing with an emerald green stone. So with the other salts, the irons and manganese, various strengths were given to the different solutions, according to the delicacy or strength of the tint which it was required to enliven or retone, the greatest strength rarely exceeding one in ten, whilst the minimum was never below thirty.

There remains just one other point to notice, which has proved of immense value in retoning some of the black and dark brown stones. This consists in dissolving treacle, syrup, or some similar saccharoid matter in boiling water, and allowing the stone to remain in this solution, preserved at about the boiling-point, for a period sufficient to produce saturation, as with the other stones, and then treating the

stone with diluted sulphuric acid. This will be found an excellent method in retoning all those stones which owe their color to natural carbonization.—*The Stone Trade Journal.*

IVORY SCULPTURE.[1]

FEW people, so far as my experience goes, even amongst those who are generally interested in works of art, seem to be aware of the extent to which ivory sculpture is practised at the present day by distinguished artists. We know that it is used for such prosaic things as billiard-balls, paper-knives, cutlery handles and toilet objects, and other objects of utility which we are accustomed to see in shop windows. Visitors to Dieppe also know that it is still famous as a centre of ivory carving, that crucifixes and figures, fan-sticks, and knick-knacks of all kinds which may be qualified as art of a certain kind abound there; that Chinese and Indian productions of a similar kind answer to the demand that is made for them, and that in recent years Japanese figures of a better type command comparatively high prices. But I am often asked whether any of our best modern sculptors work in ivory, and when we consider the beauty of the material, the esteem in which it is held by artists and their willingness to use it, the surprise to me is very great that so little is generally known concerning the practice of ivory sculpture, and the beautiful work which has been executed by our most distinguished artists. Now and again a figure or two may be observed at our Royal Academy, or perhaps a modest attempt at decorative work manages to insinuate itself at an exhibition of arts and crafts. But they are not the fashion; they attract some desultory attention, are acquired by a discerning collector, disappear, and are forgotten by the public at large. We have no museum for the encouragement of modern art like the Luxembourg at Paris, there is no fashionable lead and the encouragement of ivory sculpture would appear not to be within the terms of the Chantrey bequest.

Then again, ignorance concerning art in ivory still requires to be dispelled amongst the authorities who rule and manage our international exhibitions. Otherwise, would it be possible to believe that at these—certainly up to that at Paris in 1900—ivory carving has been classed with leatherwork, brushware, basketwork, and a number of other industries? The same juryman would be called upon to adjudicate on the decorative sewing of a boot, or the art value of a carved meerschaum pipe and the merit of a *chef d'œuvre* of ivory sculpture by a Frampton or a Dampt. It is little wonder, then, that artists of distinction declined to exhibit under such conditions, and that the public should remain in ignorance. Yet, after all, nothing is more certain than that the most distinguished amongst our sculptors have been accustomed to work in ivory. And it is pleasant to see that in recent times attempts have been made to place the art of ivory sculpture in the position which it once held and which it is entitled to hold; that is to say, on an equal footing and in an equal place of honor with sculpture in marble or bronze or in any other material. A first exhibition was held in Brussels some twenty years ago, at which all the most distinguished amongst the Belgian sculptors and some fifty others exhibited, and the year before last a most successful exhibition was held in Paris. It is true that in order to justify the expectation of a revival of ivory sculptors more than this is required. But everything must have a beginning. A great deal depends on the trend of fashion, that is to say, of patronage. It is useless to ignore this fact. Huge sums are given by the wealthy patrons of art for specimens of the antique, more or less genuine, the bulk of which goes into the pockets of the dealer. What is necessary is that their tastes or inclination should turn in the direction of the modern, of the living, artist.

The profession of sculpture demands in many ways expense. From the point of view of the quality of the material, it costs as much to execute a bust or a statuette in ivory, a foot or so in height, as to produce a life-size statue in marble. The sculptor is only too willing to use ivory as a medium, but he cannot be expected to sacrifice his material interests and educate the public at his own expense. Those whose work in ivory I shall presently briefly bring under your notice are in the first place great sculptors in marble. They naturally in another direction have regard to public requirements. Ivory is a delightful material to work, delicate and graceful in results, grateful in every way to the artist. It is to monumental sculpture what the miniature is to painting—or rather it takes its place with bronzes and goldsmiths' work. Any sculptor can work it. It requires no special knowledge or training. But from about the time of the Italian Renaissance it got into bad hands and became the product of the workshop rather than of the studio of the artist—there being all the time, however, in every age, sculptors of the highest distinction who kept alive its traditional position and redeemed its character. Still, generally speaking, as an art it fell, and suffered from its mechanical abasement. To the public nowadays carving in ivory suggests China or India or Dieppe, nothing more. People may pay for such things what they may be worth, but it is not at such a price that a sculptor of reputation can work. Then, again, the Church. When one thinks of the examples of ivory sculpture destined for the service of religion—the diptychs and triptychs, pastoral staves, statuettes, and crucifixes of the thirteenth and fourteenth centuries—one marvels at the horrors which have taken their place since the patronage and influence of the Church on art no longer are of value. And again, if one remembers the large sums obtained for a Byzantine or Mediæval ivory casket, one cannot help thinking what a great artist could produce if he were offered adequate inducement. What could be more appropriate for presentation caskets than a simple one in ivory deriving the principal value from the work of a great sculptor? What more worthless than the hideous productions of the silversmith's shop which our corporations present to foreign potentates and distinguished guests, or as prizes for distinction in the field or in sports?

Who, then, are the great sculptors to whom I have referred as being so little generally known? I wish, indeed, that there remained more time at my disposal, enabling me to do more than briefly refer to their work. The revival of ivory-carving in quite recent times is due to Belgian sculptors. This is as it should be, for throughout the golden age of ivory sculpture in the thirteenth and fourteenth centuries Flemish artists were particularly distinguished; and again in the days when the art of the rococo ran riot, the Fiammingos, the Van Opstals, and the Fay-d'Herbes were the masters when decadence reigned elsewhere. So it is at the present day; encouraged by the proprietor of the Congo to make fashionable a material which is one of the most valuable products of that possession, we have in ivory some *chefs d'œuvre* from the hands of such well-known sculptors as Julien Dillens, Meunier, Van der Stappen, Wolfers, and Samuel, not to mention a considerable number of lesser lights. Here is the charming statuette "La Gloire" of the first-named and the "Fée au Paon" of Wolfers. Wolfers's work—he is also a goldsmith—is nearly always an admirable combination of ivory with gold, silver, enamels, precious stones, and semi-precious marbles. In France I can only mention—for there is no time to do more—that such sculptors of the very first rank as Jean Dampt and Theodore Rivière, amongst a host of others, give us yearly most charming work in ivory. This is his famous "Salammbô chez Mathô." The original is in the Luxembourg. Dampt and others are famous also for busts and figures in ivory, or in ivory in combination with wood and other materials—portraits of celebrities and leaders of high life which ought to set a fashion and may become the rage. Then, again, ivory is largely used by such great artists as Lalique, and by Gardet and others for beautiful toilet articles, such as hair-pins and combs, mirrors, fans, and the like. And so to come to England, and if it cannot be said we can produce an extended list of workers, on the other hand it will be admitted that they number amongst them our greatest names. This is Frampton's beautiful "Lamia," exhibited at the Academy in 1900, and now in the collection of Mr. Willy Vivian. It is the "Lamia" of Keats—in ivory and bronze—at the moment of the transformation. The face, with its studied serenity—cryptic, snake-like—is carved in life-size from a very fine block of beautifully-grained ivory, which was supplied to the sculptor by the very long-established firm of ivory dealers, Messrs. Myers & Son, of Tower Hill. Mr. Frampton tells me that for some things he prefers the soft variety of ivory, for others the hard, and that he always uses live in preference to dead ivory. For large work a large grain is effective, for smaller, certainly less grain and closer texture. The block used for this bust weighed some 14 pounds. Whether ivory in sculpture should be polished or matted till it is almost like white marble, as some sculptors make it, and how far it should be used alone or in combination with other materials, are questions to which I can do no more than allude. Other admirable English sculpture in ivory in various private collections—our public ones possess not a single example—includes the work of such names as Alfred Gilbert, the late Harry Bates, and Reynolds-Stephens, and at Lloyd's Registry you will see it

[1]Extract from a paper by Mr. Alfred Maskell, F.S.A., read before the Society of Arts and published in the "Journal" of the Society.

beautifully used in the frieze by that clever young sculptor, Lynn Jenkins.

The subject of my lectures is so important and covers such a large extent of ground that, as you will have observed, I have on each evening been compelled to skip and abbreviate, and offer you scarcely more than indications for your consideration. As a matter of fact, it would not be difficult, I think, to make at least ten divisions, each one of which would afford more than sufficient material for an evening's lecture. But I shall be satisfied if the points I have indicated may have been sufficiently interesting to induce some of my audience to inquire further—there is ample and beautiful material in our great museums—and, at any rate, I am sure it will be admitted that ivory and its applications have played a more important part in the history of civilization than at first sight might appear evident, that the material itself and its working is full of interest, that its usefulness enters largely into our daily life, and that in the history of art it has a place which is on a level, at least, with any other of the sculptural arts, not excluding, indeed, even the graphic arts.

MORE WARNINGS FOR USERS OF CONCRETE.

IN a paper on "The Fatigue of Concrete," published in the *Proceedings* of the American Society of Civil Engineers, Mr. J. S. Van Ornum says:

"The adhesive strength of concrete to steel, low in value at best, is undoubtedly severely tried by repeated application and relief of load, and the consequent successive production and relief of the various internal stresses which tax so severely this essential and vital factor of reinforced-concrete design and construction. Passing without comment the acknowledged fact that scale or thick rust will seriously impair the adhesion, it may be said that numerous critical examinations plainly indicated that any rust on the metal (while completely absorbed by the concrete and so effectively preventing further corrosion) did materially lessen the normal adhesive power of the concrete; the bond was often found lacking opposite the rust discolorations on the concrete, while remaining firm on each side where rust had been entirely absent; and, where the adhesive bond was destroyed in the middle portion of the beam, this destruction habitually terminated in a discolored section, apparently indicating the encountering of an increased adhesive resistance at the cleaner portions of the steel.

"Another fact that has escaped deserved attention is the probability that a material excess of water used in mixing the concrete apparently lessens its adhesive power. It is realized that a moderately wet mixture is desirable, in order to prevent voids in the concrete as ordinarily placed, and especially to secure sufficient plasticity to insure a complete filling of the space around and below the network of reinforcing steel; but there seems to be a real danger that the reaction against dry concrete is being carried too far. An excessively wet concrete not only contains numerous globules of water which, when absorbed, leave the concrete porous, but these, also, especially weaken the adhesion of the concrete to the steel, because there is a tendency for such water globules to seek the surface of the reinforcement, particularly on the under side. The weakening of the bond from this cause was evident in certain beams in which the adhesion was noticeably weak, the water cavities being apparent at the bottom and sides of the steel bars."

MODERN ARCHITECTURE IN BERLIN.

AFTER making an attempt to describe architecturally some of the most recent buildings in Berlin, Mr. R. A. Raven closes a paper in *The Builders' Journal* with these words: "But it is past a joke. The sad history of it all is clear. A simple, uneducated people, the Prussians; an inrush of money into the country after a victorious war with the one nation who could teach them refinement; rapid commercial success; mushroom millionaires, who require gorgeous and flashy houses to live in; slum architects finding themselves called on to build palaces; Berlin folk charmed with the result, and making a point of sending visitors to see the fine buildings in "modern style" at Halensee—and, above all, in the Kurfürstendamm. The whole thing has been done lightheartedly, but in a few years there will be grief and remorse. The cultured Berliner, now hardly to be found outside the University, will have made his way, and will have supplanted the retired army officer and the rich "Kaufman" from their leading position in society. Then there will be weeping, wailing and gnashing of teeth, and repenting in sackcloth and ashes. Then will the wretched Kurfürstendamm be the 'Champs Elysées' of expanded West Berlin. And then, too late, will arise a writer with the eloquence of Ruskin and the sarcasm of Macaulay to pour scorn, contempt and the vials of wrath upon the shameless, undignified heads of those who to-day are erecting these hideous things."

COMMUNICATION

THE GERMAN COMPETITION METHOD.

NEWARK, N. J., December 29, 1906.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—Thinking it might interest your readers, I have translated some of the "principles" governing competitions in Germany as formulated by the United German Architects' and Engineers' societies in 1897, and revised by the Thirty-third Convention of their delegates in Dusseldorf in 1904.

They have, first, competitions *open* to all the world; second, for Germans only, and, third, limited to architects residing in certain districts, where probably home pride exists, or where a thorough knowledge of the "*terrain*" is absolutely necessary to solve the problem properly. Then they have "limited competitions" in the sense of our "big five," where each competitor receives remuneration, and the names of the competing firms are made public. (That the standard of professional ethics would be raised by the selection of these "big five" by the aldermen of most of our cities I can only imagine.) The German code recommends a "sketch competition," first, *i.e.* for all larger buildings, a competition of ideas, at a scale of 1:400 and 1:200, and, then, a limited competition between the competitors successful in the first struggle, at a scale 1:200 up to 1:100.

The code insists that the number of judges in competitions must be *uneven* and that the majority of them must be *architects*, and that the programme must be agreed upon by all the judges and their substitutes before its publication. The architects selected as judges are men of reputation who have gained their position by winning just such competitions and by erecting buildings of importance themselves. They are judges to-day, competitors to-morrow.

The judges must follow this procedure: The entire board examines and decides which sets of drawings are entitled to consideration; whether the requirements, as to time of arrival, cost, etc., have been fulfilled, and also weed out the palpably inferior designs. The remaining drawings are then thoroughly examined by the technical members—the architects—of the board, never less than two passing on each set of drawings, and judgment thereon is reported to the entire board. The eliminating and sifting of designs by the entire board proceeds, and is continued until the number of remaining designs equals the number of prizes given. Usually a majority decides the elimination of a design. The judges must publish the reasons governing them in making the awards, and must furnish each competitor with a copy of them. All drawings, together with the verdict of the judges, must be exhibited publicly for at least eight days. The most prominent architects in Germany have no hesitancy in entering *open* competitions thus safeguarded, and it frequently occurs that unknown men carry off the prizes. No *one* man would consider himself competent there to decide anything more than a school competition among students. No less than "*tres faciunt collegium*" and they must be architects.

Very truly yours,
GUSTAVUS STAEHLIN.

ILLUSTRATIONS

JEFFREY'S UNDERTAKING ESTABLISHMENT, ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.: TWO PLATES.

HOUSE OF R. R. ROOT, ESQ., DELAWARE AVENUE, BUFFALO, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

HOUSE OF M. T. BUSH, ESQ., LINCOLN PARKWAY, BUFFALO, N. Y. MESSRS. LANSING & BIERLE, ARCHITECTS, BUFFALO, N. Y.

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HOUSE OF MRS. MARTHA E. PALMER, STATE STREET, ALBANY, N. Y. MR. WORTHINGTON PALMER, ARCHITECT, ALBANY, N. Y.

Additional Illustrations in the International Edition.

WAREHOUSE ON KOMMANDANTENSTRASSE, BERLIN. HERRN ALTERTHUM & ZADECK, ARCHITECTS.

This and the following plate are copied from *Blätter für Architektur.*

THE "CRÜWELLHAUS," A.D. 1530. BIELEFELD, PRUSSIA.

NOTES AND CLIPPINGS

BRIDGE-BUILDING IN AUSTRIA.—They have no grade-crossing in Austria. A railroad with 728 bridges has just been opened by the Archduke Franz Ferdinand. It connects Trieste with Assling, passing through the Tyrol. Besides the 728 bridges, there are 47 tunnels on this wonderful railroad. The bridge over the Isonzo River is one of the fifty largest bridges in the world and has a span of 270 feet. The reason for the multiplicity of bridges is the mountain country through which the railroad runs, but the level crossing for a railroad is not tolerated in Austria.—*N. Y. Tribune.*

LONDON COUNTY COUNCIL HOUSING, 1905.—A return by the Housing of the Working-classes Committee of the London County Council shows that during the year 1905 there were provided in houses of the working class in London 26,076 new rooms, and in certain suburban districts described as "extra-London" 36,874 new rooms, making a total of 62,950. The total number of rooms demolished was 12,013, of which 8,708 were in the central area. The net addition was therefore 50,937.

The net addition to the number of rooms in the whole area was 53,499, 59,009, and 51,566 in the years 1902, 1903, and 1904 respectively. In the county of London the net addition was considerably less than in previous years owing to the unusually large number of houses demolished, the greater part of the new accommodation to replace this loss, so far as it has resulted from the exercise of statutory powers, having already been provided in previous years. It is worthy of note that of the 36,874 rooms added in the extra-London area, no fewer than 15,006 are situated in the eastern section, comprising East Ham, Leyton, Walthamstow, Wanstead, and West Ham.

The extent to which the new accommodation for the working classes has sufficed to meet the increase in the working-class population is a matter which cannot be ascertained with any great degree of accuracy. Upon consideration of the number of persons occupying the Council's dwellings it is found that an average of one and a half persons per room is a reasonable figure to take for accommodation provided within the county area, and an average of one and a quarter persons per room may be taken as a general basis in the extra-London area. If this basis be adopted it may be stated that in the whole area accommodation for 67,248 persons has been added in the course of the year, as compared with 71,317, 79,130, and 69,212 in 1902, 1903, and 1904 respectively. If the population increased in the same ratio as in the decennium 1891-1901, the increase would be 100,852 persons of all classes, although it is believed that an estimate on this basis shows a larger increase than has actually taken place. On the assumption that the increase in the working-class population amounted to two-thirds of the total, such increase would be 67,235 persons on the basis of the decennial period for the whole area, or 60,109 persons on the basis of the last quinquennial period for London and the decennial period for extra-London, whereas accommodation for 67,248 persons has been provided.—*The Architect.*

THE FRENCH AND THE FARNESE PALACE.—France's Senate has declined to ratify the vote of the Chamber of Deputies to purchase the superb Farnese Palace at Rome, which for a number of years past has been used by the French Government for its embassy to the Court of the Quirinal. The ambassador, Camille Barrere, had completed all the negotiations for the purchase, the price settled upon being 3,000,000 francs. The French Government had given its approval, and the entire transaction was regarded as completed. The action, therefore, of the Senate at Paris has attracted a good deal of comment and speculation. The fact of the matter is that if the Senate has declined to approve the purchase it is in deference to the wishes, privately expressed, of the Italian Crown. King Victor Emmanuel wishes to purchase the palace for himself. Neither he nor yet his father or grandfather has ever felt at home at the Quirinal Palace, a considerable portion of which is subject to the bann of the Church, and which has many drawbacks and disadvantages in point of comfort and convenience. Moreover, of late the objections to the Quirinal Palace have been still further increased by the tramcar tunnel which has been carried right under the royal abode, and which affords the most wonderful opportunities of outrage to the anarchists, who swarm in the Eternal City, since a bomb dropped from a passing car might easily wreck the palace above the tunnel. The Farnese palace has always been regarded as the grandest and most imposing palace at Rome, infinitely superior in every respect to the Quirinal, and represents some of the finest work of Michael Angelo, Bramante, Sangallo, and, above all, Caracci, who spent no less than eight years in painting the frescos of one of the great halls on the first floor. The palace owes its creation to the princely house of Farnese, which furnished several Popes to Rome, notably Paul III; reigned for several hundred years over Parma and other petty Italian states and became merged into the sovereign house of Bourbon through the marriage of its last survivor, Elizabeth Farnese, to King Philip V of Spain.—*Marquise de Fontenoy, in New York Tribune.*

SAN FRANCISCO'S FIRE LOSSES.—It is disappointing to find, eight months after the San Francisco disaster, that the Board of Trustees of the San Francisco Chamber of Commerce can speak of the actual losses only in the most general terms. The most noticeable word in the following extract is the preposition "about," abhorred by the statistician:

"The total area burned was about 3,000 acres, or about 4.7 square miles, containing 520 blocks and about 25,000 buildings; one-half of these were residences.

"The amount of insurance covering property in the burned district was approximately $235,000,000 (estimated). All of this had been written by companies authorized to do business in the State, except $6,000,000, which had been placed outside of the State in some one hundred companies. The value of buildings and contents destroyed in the fire must have been about $350,000,000, being an estimate upon the insurance liability, the known ratio of insurance to value (about 70 per cent.), and a guess that there was about 5 per cent. of property that carried no insurance.

"An immense sum of insurance money has been paid into this city, a far larger sum than companies have ever been called upon a pay at one time before. In spite of the earthquake, in spite of the nearness in time of the Baltimore and Toronto conflagrations, the companies will finally have paid undoubtedly in the neighborhood of 80 per cent. of the amount of insurance involved. At Chicago there was 50 per cent. paid; in Baltimore 90 per cent."

THE COST OF SOME BUILDINGS.—The Capitol at Washington cost $13,000,000. The Congressional Library at Washington, covering acres of ground and regarded as one of the finest buildings in America, cost only $5,746,000. The Boston Public Library, with its wealth of decoration, cost $3,300,000.

The St. Regis Hotel, the most magnificient hotel in the world, was completed, including nearly a year lost in strikes, decorated and equipped in four years, at a cost of $5,000,000. The Waldorf-Astoria, with its 1,500 rooms, its magnificent decorations and its elaborate mechanical devices, cost $5,000,000. And the Hall of Records cost a million a year for ten years! Why?—*The Broadway.*

MELTING FIRE CLAY WITH SUN'S RAYS.—There is an apparatus which concentrates the rays of the sun from more than six thousand small mirrors on a spot about seven inches in diameter. The heat generated is about 7,000° Fahrenheit. Iron can be melted in less than a minute and fire clay fused in about three minutes by this machine. Magnesia, one of the hardest things to melt, requiring a heat of about 6,400° Fahrenheit, can be reduced to a molten state in twenty minutes. For the benefit of those who wish to forget the name of this instrument, it has been christened the pyrheliophor.—*Birmingham Weekly Post.*

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SOCIETIES, PERSONAL MENTION, ETC. IV

WHATEVER opinion may privately have been entertained as to the cost value of the repast set before them, there can be no question but that those who had the good fortune to attend the A. I. A. banquet in Washington last week, felt that as an occasion it was well worth the price. The affair was carried off not only with success, but with almost as much spirit as marked the banquet of two years ago. The same successful issue attended all the features of this jubilee convention, the ceremonial presentation of the gold medal at the Corcoran Art Gallery, and the dedicatory ceremonies at The Octagon passing off smoothly and with considerable éclat, which will later be revealed in detail when, in the course of time, the Institute's *"Proceedings"* are printed and distributed. It is a matter of regret that the limitations of our own space prevent our making more than a passing reference to the festival aspects of the meeting, all the space we can afford being required to give a partial report of the matters discussed and transacted at the business meetings, which were more than ordinarily interesting and useful. The promoters of the jubilee deserve to be applauded both for conceiving and for executing so successfully an affair which was not only ornamental, but, probably, of great practical usefulness. The Gold Medal addresses, not having reached us in time, will be published next week.

IT is not often that public officials discover any sensitiveness to hostile criticism of their official acts, but the Philadelphia Board of Education, early this year, not only has allowed itself to show that the private feelings of its members had been irritated by public clamor, but permitted itself to manifest resentment in a very extraordinary and reprehensible way. Because the Board had been rebuked in Councils—essentially the same sort of a body as that which approved the squandering of needless millions on the unspeakable Public Buildings, and which, doubtless, applauds the conduct of the architect and builders of the State Capitol—for its extravagance in building fireproof school-houses, it has voted not to build the Astenville school-house as a six-division fireproof building, at a cost of $65,000, but as a four-division combustible affair, at a saving of $40,000! As the Board has taken pains that the public shall learn of its action, it is quite probable that it is only bluffing Councils, and counts on being urged by a general protest from the sane citizens of the affected neighborhood to reconsider its decision and revert to its original plan. At the same time, school-committees do allow themselves to subject their charges to extraordinary and unjustifiable risks, as was reported to be the case in Brooklyn recently, where the school-committee, relying on the contractor's "guaranty" that it could be done safely, allowed school sessions to be carried on uninterruptedly while the building, of brick, we believe, was jacked-up and moved to a new site some four hundred feet away.

IT seems doubtful whether the men who are investing money in reinforced-concrete buildings in metropolitan cities have taken into consideration one rather important factor. In considering his investment, an owner figures out not only the prime cost and the taxes, but, of course, the repairs and depreciation as well; but we doubt very much whether it occurs to him that at a given time he may find an elephant on his hands that he does not know how to deal with. Architects please themselves with thinking they build for all time, whereas the average age or endurance of a building in the United States, city and country everywhere, cannot be much more than fifty years, while in the large cities it is hardly more than thirty, and is likely to become less. What with fires, transformations and retransformations of trade sections, changes of architectural fashions and so on, the man who builds to-day is likely to see the time when either he himself or the next owner desires to replace the building now just erected. To tear down a wooden, a brick or a stone building has been always a simple and not very costly task, but even these simple tasks have been the cause of many deaths; it has been found recently that the steel-skeleton building can be dismantled with no very great increase of danger, though with a con-

siderable enhancement of cost. But do those who are now building in reinforced-concrete realize that when the time comes to replace these monolithic buildings, as come it inevitably must, it may prove necessary to quarry them down with steam-drills and dynamite? And do they fancy that their neighbors, the abutters and the man in the street, will allow them at their pleasure to set off blasts on a gradually descending scale from fifteen stories downward?

THIS phase of the reinforced-concrete craze deserves consideration, and it has its æsthetic as well as its economical aspect. With so many minds at work investigating and experimenting, it must be granted that sooner or later the use of concrete will be not only practicable, but safe. But everyone concedes that the architectural handling of the material is going to be difficult, and that early attempts are likely to result in more failures than successes. The consequence of this is that the public, at least, and the owners, perhaps, will wish to have these early efforts replaced with more than average celerity. But if concrete buildings, which have sometimes come down so easily during construction, once built can only be got rid of by slow, costly and dangerous quarrying, it seems not unlikely that these unsuccessful early efforts may have an undesirably prolonged existence, to the annoyance of the public and the pecuniary loss of the owner; for it is undeniable that an ugly building in these days does not rent as well as an attractive one. The difficulty of replacing concrete buildings in urban communities needs to be considered, since it inevitably must be encountered, and very shortly.

THE Society of Beaux-Arts Architects is worthy of all praise in one respect, at least, since it shows a marked disposition to copy, within the limits of its possibilities, the extraordinary liberality and generosity of the French Government. We question whether it is sufficiently known that the "Paris Prize," established a year or two ago by this society, is open to every draughtsman under the age of twenty-seven, whether he may or may not be affiliated with the parent society or with any of the ateliers associated with it. The winner of the Paris Prize is admitted without further examination to the First Class in the École des Beaux-Arts, provided, merely, he can exhibit proofs that his previous studies have covered essentially the same ground that is comprised in the curriculum of the Second Class. The winner not only enjoys this very material benefit, but he receives during a period of two and a half years a quarterly allowance of two hundred and fifty dollars from the Society of Beaux-Arts Architects itself. The dates for the approaching competitions—two preliminary and one final—are March 9, March 30 and May 18, next. Fuller particulars may be had on application to Mr. Lloyd Warren, 3 East 33rd Street, New York.

THE defacement with some black liquid of the figure of "La Danse" in front of the Paris Opera-house, nearly forty years ago, will always remain, probably, the most noted, as it is the most singular, incident of a very peculiar form of vandalism, singular because exhibiting a wholly unexpected spirit of prudishness in the gay capital. The somewhat similar defilement of the figures of Alsace and Lorraine on the Place de la Concorde, not long afterwards, had, of course, a political and not a moral purpose. In this country, students at Cambridge have found it a part of the liberal education they were acquiring to give a coating of red paint to the bronze statue of John Harvard or to the Soldiers' Monument on the public common. But it is not easy to determine why the figure of "Africa," recently set in place at the New York Customhouse, should have been disfigured last week, as the figure is not sufficiently nude to attract even the censure of Mr. Comstock, and it seems rather far-fetched to imagine that racial antagonism had anything to do with the matter. Perhaps some poor "ghost" attempted in this way to get even with an unappreciative world.

THE deforestation of the country is proceeding in a geometrical ratio, while our politicians are giving their most active attention mainly to the preservation of their own "fences." By and by, when the situation approaches the irremediable, we feel sure that one of the laws to be passed will be one declaring a "close season" on Christmas-trees, and it will cause anguish to many a young American, who cannot understand why he should be made to pay for the folly and obliviousness of the Speaker of the House of Representatives. This is not a fantastic notion, for in the year 1905 sixteen hundred thousand Christmas trees were cut in the State of Vermont, yielding to the choppers only two cents each. At the same time, the older growths were cut for timber, firewood and paper pulp, so that the candle, as it were, was burned at both ends. Quite apart from the hygienic and, in the way of preservers of mill-steams, the commercial value of the White Mountain forests, they have a very direct bearing on the prosperity of the State of New Hampshire, where in 1905 summer visitors paid out in the various summer resorts $7,549,375, over and above car-fares, etc., and it is absurd to suppose that, once the mountains are denuded of their forests, visitors will still flock to the hotels, wherein capital to the amount of $22,-285,179 is already invested. If the National Government will do nothing, it is high time that the State or the hotel people did something effective in their own defence.

WE believe that the sympathies of all decent people in St. Louis will be alienated by the recent action of the directors of the Louisiana Purchase Exposition Company, who have told the National Sculpture Society pretty bluntly to mind its own business and not attempt to give any lessons in propriety of conduct to any art community situated on the farther side of the Mississippi. The Exposition managers refuse to allow the National Sculpture Society to intervene in the matter of their intended casting in bronze of Mr. Niehaus's equesrian statue of St. Louis, in spite of the artist's protest and objection. As there is distinctly a matter of principle involved, we hope that the sculptor may find legal means of thwarting the purpose of the directors which, under the circumstances, is distinctly ill-mannered, if nothing more.

REPORT OF THE BOARD OF DIRECTORS TO THE FORTIETH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, JANUARY 7, 1907.

THE Board of Directors reports that it has held four regular meetings, and that between these meetings its Executive Committee has been frequently in session.

MEMBERSHIP.

The Board reports that the Institute has now 763 members, to wit, 331 Fellows, 432 Associates, 62 Honorary Members and 82 Corresponding Members.

Since the last report of the Board five Fellows have been elected, namely, J. Randolph Coolidge, Jr., Boston; Richard Ernest Schmidt, Chicago; S. B. P. Trowbridge, New York. Four Fellows have died, namely, Messrs. G. W. Cady, A. H. Kipp, Stanford White, and E. R. Willson. Four Fellows have resigned, A. W. Cordes, Wm. Fitzner, C. H. Palmer, W. H. Tyndall. Two Fellows, Havelock E. Hand and Chas. R. Percival, have been dropped from the roll of membership.

Twenty-one Associates, Charles H. Alden, Jr., Albert H. Belvins, Edward T. Boggs, Wallis Eastburn Howe, Thomas W. Reely, Howard Shaw, were elected February 8, 1906; F. E. Gieseck, Electus D. Litchfield, Fernand Parmentier, Walter Louis Rapp, John B. P. Sinkler, Arthur H. Smith, H. Spielman, Emlyn L. Stewardson, Frank E. Wallis, John Zettel, were elected May 19, 1906; Stephen Codman, D. Despradelle, H. K. Klutho, E. L. Masqueray, Dwight Heald Perkins, were elected October 24, 1906.

Two Associates, Robert C. Ferguson and Henry C. Hayward, have resigned.

One Honorary Member, Sir Casper Purdon Clarke, has been elected. No Corresponding Members have been elected during the past year.

ASSOCIATES.

The Board wishes again to impress upon the members of the Institute the importance of securing the election as Associates of all those practising architects who, through their actions and the quality of their work, have shown that they would be desirable as members of the Institute. It is only by constantly drawing members from the ever-increasing ranks of the profession that the Institute can maintain and increase its work of raising the standard of professional life and conduct.

The Board nominates for election to Honorary Membership, Hon. F. G. Newlands, United States Senator from Nevada, and Mr. Leopold Eidlitz, one of the founders of the American Institute of Architects; and for Corresponding Membership, Mr. James G. Cutler, Professor William H. Goodyear and Francis H. Bacon.

The Board nominates for election to Fellowship, Messrs. Henry C. Bacon, Wm. S. Post, John Russell Pope, New York; A. B. Pond, Chicago; Jas. P. Jamieson, Philadelphia; Clarence A. Martin, Ithaca, N. Y.

CHAPTERS.

As the prosperity of the Institute is intimately connected with that of its Chapters, it is gratifying to know that the Chapters are almost without exception in a flourishing condition. Since the last convention a new Chapter has been formed at Atlanta, Ga. The total number is thus raised to twenty-eight. Their membership varies from five at Dayton to 192 at New York. Some of the Chapters have exerted a marked influence for good upon their communities, and it is important that members should not forget how great a force may be brought to bear upon public opinion by the action of a Chapter.

THE FINANCES OF THE INSTITUTE.

The finances of the Institute have given the Board most serious concern. While the receipts from fees of members, if administered with economy, are sufficient to pay the ordinary expenses of operation, they do not suffice for extraordinary occasions, for which special provision has to be made. This is very clearly shown by the fact that, no such provision having been made for the unusual celebration held in January, 1905, your present Board has labored under a deficit of $2,500 resulting from that event. The Board determined that such a thing should not occur again, and is glad to report that suitable provision has been made by the Chapters and the members for the cost of the fiftieth anniversary celebration, so that no charge greater than that ordinarily assumed by the Institute on account of the Convention will fall upon it.

THE OCTAGON.

The interest upon The Octagon notes ($800 per annum) has been regularly paid from The Octagon Fund, and has not been permitted to appear as a charge against the Institute's general fund until the last half of the present year, when $400 was taken from the current funds. The taxes on the property ($317.01), recently raised to $480.53 per annum, have also been paid from The Octagon Fund, until this last year, when they were taken from current expenses.

The repairs to The Octagon most urgently needed have been made, but much yet remains to be done, both by way of repairs and furnishing. Through a committee under the chairmanship of the First Vice-president of the Institute, a serious effort has been made to raise the sum required to extinguish the debt upon The Octagon, and the effort, thus far splendidly successful, must now be pushed to a conclusion. The Institute here in convention assembled should make it its highest, its immediate, duty to secure pledges for the remainder, so that this fiftieth anniversary may be signalized by leaving the Institute's historic mansion and ample grounds entirely free from debt.

LEGACIES.

The Board draws attention to the fact that the European Architectural Societies are frequently enriched by the legacies of the members. This practice is frequent in the Royal Institute of British Architects and in the Société Centrale des Architectes Français; these legacies in the case of one society reached 395,193 francs in a single year. The Board suggests to the members of the Institute that such a practice is worthy of imitation.

THE GOLD MEDAL OF THE AMERICAN INSTITUTE OF ARCHITECTS.

The Board reports that, acting in accordance with the wishes of the Institute, it has taken the important step of establishing in the name of the Institute a Gold Medal for distinguished achievement in architecture, and has made the award of the medal to Sir Aston Webb, R.A. It is a fortunate circumstance that the medal may first be conferred upon the fiftieth anniversary of the foundation of the Institute. The medal has been executed, under the advice of Mr. C. F. McKim and Mr. Geo. B. Post, with admirable skill and with the highest beauty by Mr. Adolph A. Weinman. It is worthy of the best traditions of the art.

Your Board proposes to formulate rules governing the future award of the medal and to submit these rules for the consideration of the Institute at its next convention.

THE TABLET IN HONOR OF THE FOUNDERS.

At the thirty-ninth convention your Board was instructed to offer at the fiftieth anniversary some signal honor to such person or persons as had done most for the profession or the Institute during the last fifty years. Your Board, after giving careful consideration to the problem thus presented, has deemed it wise that it should assume the form of a tablet in honor of the founders of the Institute and of those who joined them in framing its constitution. This tablet, erected in The Octagon, is from the design of Mr. Edgar V. Seeler.

SEVENTH INTERNATIONAL CONGRESS OF ARCHITECTS.

The Seventh International Congress of Architects was held in London last July under favorable auspices and with entire success. The Institute was represented by the President, First Vice-President, by two past-Presidents and by forty members. Acting in what appeared to be the spirit of the thirty-ninth convention, your Executive Committee, of whom a majority were present in London, tendered to the International Committee, on behalf of the American Institute of Architects, an invitation to hold the next Congress in America. This invitation was warmly received, and, although a decision was reached in favor of Vienna, it is not improbable that the next subsequent meeting may be held in America.

MUNICIPAL IMPROVEMENT.

The large space given in the current volume of the *"Proceedings"* of the Institute to questions of municipal improvement bears testimony to the continued interest of the members in this subject. During the past year substantial advances have been made in such improvements in many cities, while in others the subject has been under serious consideration.

ARCHITECTURAL SCHOLARSHIPS.

In accordance with the instructions of the last convention, the Board has considered the question of co-operating with the Architectural League in the foundation of more scholarships in schools of architecture. The Board was somewhat surprised to find that for those already in existence the competition was by no means

keen, and that one of them was actually vacant this year. The Board, therefore, deems a further study of the conditions necessary, and hopes that the apparent failure may be found and overcome.

BUREAU OF THE FINE ARTS.

Your Board was instructed by the thirty-ninth convention to lend its aid to the establishment of a Governmental Bureau of the Fine Arts. It found that two bills bearing on this subject were about to be presented to Congress. One of these appeared to be much more satisfactory than the other. In the improvement of that one your Board assisted, and it stood ready to coöperate with other societies in urging its passage. Owing to the crowded condition of Congressional business, these bills were not reached. Your Board has the subject in mind and will endeavor to advance it when any opportunity occurs.

THE WORK OF COMMITTEES.

The many and varied subjects which come before the convention and Board have generally been referred to committees to secure their adequate consideration.

The reports of many committees will shortly be presented, and the Board does not wish to say anything by way of anticipation, yet it deems a word of explanation wise in some few cases. The last convention ordered that a study of competitions should be made by a special committee, whose duty it was to consult the Chapters and report to the Board. It then became the duty of the Board to study the subject and send a report to each member of the Institute.

Unfortunately, owing to the great length of time required for the work of the committee and the consultation of the Chapters, it has proved impossible to carry out the convention's programme in its entirety. The Board has received the final report of the committee only at its present session. The report is printed and will be distributed at the convention as it comes from the committee. The Board commends this most important subject to the very careful consideration of the convention.

The Board of Examiners, the details of whose work, owing to their nature, are not laid before the convention, performs a difficult and somewhat laborious task which it discharges with great fidelity, and for the performance of which the Institute is much indebted.

The Committee on Practice established at the last convention was confessedly experimental. As far as may now be seen the experiment will prove successful. One link in the complete chain for a proper handling of cases of discipline seems still to be lacking, but the Board hopes to supply it without calling upon the Institute to take action.

The Committee on Specifications established at the last convention, has done a great amount of preparatory work, and an adjunct committee has been appointed to study the standardization of the symbols used in architectural drawings.

The work of the Committee on Education has been of great interest, if for no other reason than that it shows that men of common high purpose, entertaining at the start ideas of apparently the most antagonistic character may, by the logic of the facts before them, be brought into perfect accord as to all that is fundamental. The report of the committee has many other points of interest to which the Board directs your attention.

All of which is respectfully submitted by the Board.

FORTIETH CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

FROM the various reports presented at the second day's sessions, January 8, and the discussions to which they gave rise, we make the following selection, beginning with the report on the tests that are being carried out by the National Advisory Board for Fuels and Structural Materials:—

MR. POST:—I was not aware that I should be called upon on this occasion, and therefore am not prepared to do anything more than report in the most informal mannre. The Bureau of the Geological Survey received an appropriation for the purpose of making an investigation with regard to the entire question of coal supply, and the economic handling of the whole question. They have done most admirable work, they have also received an appropriation to make a series of proper and exhaustive tests with regard to the strength of materials in general, and an advisory committee was appointed to counsel the Bureau with regard to the lines upon which the investigations should be conducted. The Institute was requested to nominate two members of this advisory board, and Mr. Eames and myself were honored and I attended one meeting in Washington in the early summer, when the entire matter was more or less discussed, and my advice to the Bureau was that the most important tests which could be made would be those for the purpose of gaining knowledge and if possible establishing constants and formulas and computations of the strength of compound structures, like reinforced-concrete, and that experiments made with steeel and long-leaf yellow pine should be extended to other materials. For you all remember that the experiments made with long-leaf yellow pine particularly developed the facts that the constants which we had all been using since Thurston, Fairbairn, and others made the experiments, were entirely faulty and that timbers in large sections had nothing like the strength we had computed them at. By a strange Providence our computation of loads, particularly the loads used as a basis of calculation for floors, were in excess of the railroad loads. And it was that which caused our walls and floors to stand up and not fall down. Now it is possible with regard to stones and other materials than long-leaf yellow pine—certainly with regard to reinforced concrete, that the formulas published by the representatives of patented forms of construction are equally defective. If so, the result will be quite disastrous. I believe, this year experiments will be made with great care. I regret that subsequent meetings of the Board occurred when it was impossible for me to be present, and although I have just received an appointment as chairman of an important sub-committee, I shall have to decline it as my time is not my own, for I cannot come to Washington at the time it is necessary for the committee to assemble. I am sorry that I cannot give you more details or definite statements, but the members of the Institute should urge their representatives in Congress, both their Senators and Representatives, to see that adequate appropriations are made annually for the purpose of conducting these experiments to their ultimate end, and furnishing the profession with such data so that they may be sure that the work they erect is constructed on sound premises, and that it will safely stand and bear the loads imposed on it. At the World's Congress I was forced to speak on this subject, as representatives of certain forms of construction had read papers that suggested the inference that the special forms they advocated were accepted as the best and only practice in the United States. I told the gentlemen that while, as an economic form of construction, we were forced to use it, we looked upon it with a certain amount of suspicion, using it in an amateurish way—I am speaking of reinforced-concrete—and that our predilections were strongly in favor of materials of which we could definitely calculate the strength, rather than materials, which we had to test after we had constructed with them. Also that we looked with disfavor upon any materials of plastic form, on account of the great care necessary in the selection of material, its mixture, and that our opinion on reinforced concrete was much in accord with that of the distinguished Samuel Weller with regard to veal pies—that they were very good things—when you knew the lady as made them.

MR. HATTON:—Mr. Post has spoken of suspicion as to whether the constants given by the advocates of patent forms of construction were accurate. I had occasion to use concrete, and appointed a well-known company whose work no one had ever called into question. They published certain constants. They put in the work much heavier than the minimum required, and actual tests then showed that the information was absolutely false and that the floors would not stand the loads. I conclude that the only course to pursue is to view with suspicion all patented systems of reinforced concrete, and their agents, and that it is unsafe and wrong practice for us to allow the contractor to have any say as to the amount of reinforcement to put in. The only safe way is to employ an independent engineeer to calculate the thickness of slab, so that the contractor shall not be allowed to use his judgment, and that reinforced-concrete construction can be carried out without any resort to patent construction. Put it on the same basis as steel construction, that the architect shall assume the responsibility for the reinforcement, and let the contractor be responsible only for the quality of the concrete and the manner in which it is put in place. There are many buildings erected which have not fallen down only because they have not been subjected to the loads they are theoretically capable of bearing.

THE PRESIDENT:—A communication has been received by the Board of Directors from Major Hobbs, of the Watervliet Arsenal, that they have been conducting a series of experiments on reinforced-concrete made at the Arsenal, but that they deem it extremely important to procure samples made in actual practice, especially of reinforced-concrete columns, and they are prepared to send any architects the necessary instructions for selecting

samples, and rods and end plates for packing, and they will bear the costs of transportation. They would break them at the Arsenal and transmit the reports of the tests to the persons submitting the samples and publish the reports of the tests in the Government publications; they invite the Institute to co-operate with them in the work. The Board took action, so that the communication will be sent to the members of the Institute, drawing the matter to their attention.

MR. PERROT:—The matter has been brought up by Mr. Post. I am chairman of the committee in Philadelphia which is working with the Building Department to formulate rules and regulations governing the erection of concrete buildings in that city. We have investigated all the formulas and systems propounded by the contractors and inventors. We have put up about forty reinforced-concrete buildings, none of which has fallen down. The architect should design his building and reinforcement by his own formulas, or worked out by intelligent engineers who understand the subject. An architect must perforce take up the position that he is the arbitrator of his own design. A prospective client said he did not know whether he would employ an architect, as he had been told by a contractor that he made the drawings for the architect. So we are getting into bad repute. Furthermore, every patent system has its own axe to grind, and its agents make representations which are more or less strained as to truthfulness. I know of no formulas which can be used as safely as a steel beam, if the work is done up to the proper standard. The difficulty is not with the standard, but with the workmanship. I have tested beams twenty feet long in which the strength did not vary more than 6 per cent. So my constant must be very close. The University of Illinois is making a series of tests in connection with the different universities, and Professor Talbert has issued some bulletins which give the results of experiment on a number of beams.

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THE PRESIDENT:—The Board of Directors has nominated for Honorary Member, Mr. Leopold Eidlitz, and will call upon Mr. Post to give its reasons for the nomination.

MR. POST:—It is hardly necessary in an assembly of American architects to urge the election as an Honorary Member of so distinguished and well-known a man as Mr. Eidlitz. Mr. Eidlitz was one of the first six or seven men who, fifty years ago, met together in the city of New York for the purpose of attempting to effect the organization of a national society for the advancement of the art of architecture. Of these six or seven men but two are living. One, Professor Babcock, of Cornell, is an Honorary Member of the Institute; the other, Mr. Leopold Eidlitz, who has done some of the great work of his time, formerly an influential member of the body, is still living, and has the greatest possible claim, I think, upon the Institute to be added to the list of its members. I therefore propose him, sir.

I move that the Secretary be directed to cast a single ballot.

The election was unanimously carried and the Secretary cast the ballot as directed.

THE PRESIDENT:—The Board did not in its report include the name of one gentleman whom it had under consideration, for the reason that at that time it had not received his consent to his election. Since then the consent has been received. The Board, therefore, nominates the Honorable William H. Taft, Secretary of War, and calls upon Mr. Cram to present its reasons for the nomination.

MR. R. A. CRAM:—I was not informed until about three minutes ago that I was expected to give reasons which lay behind the nomination of Mr. Taft, as an Honorary Member of the Institute. I am, therefore, unable to give in any satisfactory degree a list of the reasons which justified this action. I think, however, they will all appeal to you, even without any particular reference on my part. The Honorable the Secretary of War is and always has been deeply interested in all the best interests of our profession. It is not merely an academic interest; it goes farther than that, and touches on those questions which might seem to us to be expected only from actual practising members of the profession. It falls within the province of the War Department to come into close contact with a great deal of building—the different army posts in the United States and the Colonial possessions—and there is a great opportunity for a Secretary of War to exert a strong and wholesome influence on all this architectural work. Such influence has been exerted in the past by such secretaries as Elihu Root and William H. Taft. And that the same wholesome influence will be exercised in the future is, I am sure, a matter of which we may be perfectly certain. I have, therefore, the distinct honor of presenting to you the name of the Honorable William H. Taft as an Honorary Member of the American Institute of Architects.

Upon motion, the Secretary was directed to cast a ballot in favor of the Hon. William H. Taft, and he was thereupon declared elected.

THE PRESIDENT:—The Board has nominated the Hon. Francis G. Newlands, Senator from Nevada, to Honorary Membership, and will call upon Mr. Mundie to give its reasons for the nomination.

MR. MUNDIE:—Mr. President and Members of the Institute, from the manner in which the name of the Senator from Nevada was received upon the reading of the report yesterday morning, I infer that hardly anything more than a formal introduction is necessary. But to do that would be to do an injustice to him and to ourselves. As to the few of us who have been closely connected in the past five years or more with the Executive Board of the Institute, we feel deeply the debt of gratitude that our profession and, in addition, the arts of painting and sculpture, owe to Senator Francis G. Newlands, of Nevada. His enduring efforts in the Senate in relation to the Park Commission and the Greater Washington, followed as they were by his strenuous efforts for the preservation of the Mall; and then his work in passing through the Senate the bill for the recognition of the National Academy at Rome, together with the fact that he has always stood for the best in the selection of architecture, painting and sculpture, and, more than all, he has ever been the champion of the cause that the laborer was worthy of his hire. His excellent judgment and his advice and his time have ever been ours, freely given, and more than this has he given. Such is a brief, a mere brief, of the assistance the world of art in America has received from Senator Newlands, a lover of art and of his country, steadfast in all that tends to the highest ideals. I feel it a personal honor to present his name, and in doing so I feel we do ourselves a greater honor. I therefore take pleasure in presenting the name of Senator Newlands, of Nevada, for Honorary Membership in the American Institute of Architects.

The motion was seconded, adopted, and the Secretary was directed to cast a ballot, which was accordingly done and Senator Newlands was declared elected to Honorary Membership.

THE PRESIDENT:—The Board has nominated three Corresponding Members. The first is Mr. Francis H. Bacon, of Boston, and I will call upon Mr. Andrews to give the reasons for the nomination.

MR. ANDREWS:—I think every one knows who is referred to in this nomination, Mr. Frank Bacon, of Boston, who for years has been the arbiter of the destinies of the interiors of our houses and buildings. Mr. Bacon received his education as an architect at the Institute of Technology in 1875 and 1876. For several years he was in offices, and then at the call of the Archæological Institute of America he went to England and then to Vienna, and then to Munich, where the winter was spent, and then on to the Ægean, where, in Asia Minor, the town of Assos was excavated by them. His continuation of this archæological task has been gradually approaching completion in the shape of several monumental volumes, which are of the most wonderful beauty of draughtsmanship and of delightful literary charm. Mr. Bacon's work in his applied career, that of furniture and interior decoration, needs no comment. By his artistic integrity he has placed the business firm with which he has been connected at the head of such establishments in this country, and all who know the man's simple character and lovely nature will feel that this body will honor itself by associating him with us.

Upon motion, the Secretary cast a ballot, and Mr. Bacon was declared elected a Corresponding Member.

THE PRESIDENT:—The Board has placed in nomination for Corresponding Membership the name of Mr. James G. Cutler, of Rochester, N. Y.

MR. STONE:—I need hardly remind the older members of the Institute that James G. Cutler was for years an active and interested and helpful member of the Institute. Elected to this body in 1884, he continued a member as long as he continued the practice of his profession. He went out of that to go into manufacturing and, while very indirectly connected with it, has felt that it was necessary for him to resign from the Institute. Since then he has taken a great interest in several matters, civic matters; was active in the formation of the new charter for the city of Rochester, N. Y.; was absent in Europe when it came into operation; was telegraphed to in Italy that he must allow his name to be used as the first Mayor under the charter, irrespective of party. He was elected by a very large vote to the Mayoralty and

again re-elected, and has devoted his time to the city's civic improvement, and especially to the extension of its park system. He stands for every object that we stand for, and I know he would be glad to be continued associated with his former fellow members of the Institute.

Upon motion, the Secretary cast a ballot, and Mr. Cutler was declared elected.

THE PRESIDENT:—The Board has nominated Professor William H. Goodyear for Corresponding Membership, and will call upon Mr. Cass Gilbert to give its reasons.

MR. GILBERT:—I have been asked by the Board of Directors to present the name of Professor Goodyear, and in doing so I think it is not necessary to more than mention his name, to have the members of this body remember that he has contributed by his writings for some years past very largely to the sum of knowledge upon mediæval art. Professor Goodyear, in his lectures, magazine articles and books, has developed what is a new theory of design, and through him we are arriving at a larger knowledge of mediæval architecture in Europe. His work is of such importance that the Board of Directors deemed it proper and right that Professor Goodyear should be included in this body. I cordially recommend his name to you, and believe that the Institute will honor itself in honoring him. I therefore press his nomination.

Upon motion, the Secretary cast a ballot, and Professor Goodyear was declared elected.

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MR. ELZNER:—The discussion touched this morning on the scientific data on the strength of materials. I would like to call the attention of the Convention to the American Society for Testing Materials. They are conducting a most valuable work, and I would like to urge upon you all to take up membership in this Society. I would also suggest that the same work is being done by the Institute, and would suggest affiliation, if possible, with the Society, and I therefore move that the powers of the Committee on Specifications be so enlarged that they may include co-operation with the American Society for Testing Materials, in the work of securing and establishing uniform specifications for building materials. The Society is divided into a number of committees, who are carrying on the tests, and the work is resulting in the accumulation of a mass of scientific data of unquestionable interest to us all. Some take up stone, others steel, concrete, wood, and so forth. That is exactly the work that our Institute should assist in.

MR. PARRALL:—I should like to support that resolution, for the work the Society has been doing for several years is certainly one we should take up with, and the data they are publishing for the benefit of the profession who make use of these materials are certainly of much value. Our experience as architects has made it necessary for us to conduct tests of our own, but this is not possible in limited office practice. But now we have the benefit of the work done in all the large universities, Illinois, Columbia and the others, as well as the work done by the Government. We should co-operate with the engineers who have offered to test columns constructed in actual practice, as suggested by the President. As architects representative of the best that the career produces we should—as was brought out in the discussion by Mr. Gilbert this morning—be familiar with the materials which are used in the buildings we design. If the architect would determine, as the engineer does, what is going to be used, we should have more weight with our clients. We should do everything we can to further the gathering of this information and to put it in the office of every architect. While we are not doing it somebody else is, and as this is a practical age we should adopt the means that others adopt to maintain our supremacy. I think the motion of Mr. Elzner should be adopted and every assistance given to the investigation.

The motion was adopted.

[End of Second Day.]

At the third day's session the following discussion of the ever-interesting question of competitions took place:

MR. HEWLETT:—I desire to renew my resolution of yesterday on the report of the Committee on Competition.[1]

MR. CRAM:—This resolution is the result of a feeling on my part that under the action taken by the convention we are inviting this condition: That a year from now, when the Committee on Competitions makes its final report, as it is expected to, the subject will be just about where it is now. The report will content itself with a general denial of any possible efficiency or value in the idea of open competition. I think that any of us who heard the report must have felt that the report indicates a desire on the part of the committee not only to discourage the idea of competition, but to ask you to abstain from any recommendation for the regulation of open competition. There are two questions involved. I would be very glad to see the strongest possible recommendation adopted for the discouragement of open competitions as now held—in fact of all competitions. But the open competition is fully established, and by ignoring it we are neglecting one of the things we certainly ought to do. We shall, if we can, adopt some simple scheme by which it can be ameliorated: the close competition will take care of itself. Any of us invited to a close competition have little difficulty in making such arrangements with the committee as to protect our interests and the interests of the profession: but open competitions are such that no such preliminary barring is possible, and it is therefore the open competition which most needs our recommendation.

It does not seem to me that any regulation can be made and put forward which will ameliorate the conditions of open competition so long as it remains an open competition. The open competition is so wrong fundamentally that I cannot help feeling that the convention should consider the thing very carefully before doing anything which would appear to give the slightest sanction to the idea of open competition as such. I would rather this anomalous objectionable institution should stand as it is, a thing beyond the recommendation or consideration of the Institute. If we go into the open competitions, we go into a pure gamble. We take our chances as with a roulette wheel, which may or may not be an honest one. But we should leave it to the action of each member of the Institute. If we try to regulate it, we inevitably give the idea that we accept the principle that the open competition, while bad in itself, may be under certain circumstances acceptable or endurable. Therefore, I hope the convention will refuse to sanction even impliedly the idea of any kind of open competition.

THE PRESIDENT:—Mr. Cram is under a misapprehension as to the existing state of affairs. The Code of Competition under which the Institute now works makes definite provision for the open competition and states how it shall be regulated. Therefore, it recognizes the open competition.

MR. WALTER COOK:—I am very much in sympathy with what Mr. Cram has said. I consider it a misfortune that the Institute, now or ever, has taken any steps with regard to open competition. I am opposed to giving the Committee on Competitions any direction that it is to recognize or formulate any rules for a proceeding which I sincerely hope they may ignore entirely, and by ignoring condemn.

MR. COOLIDGE:—In a matter so important as this, I think it will be well to see why the open competition has existed among us, and why we shall be doing a questionable thing in going on record against it. I am not here to advocate it personally, but I would point out to my professional brethren that in a competition there are two sides—the architect and his client. Clients institute competitions with the purpose of getting the best possible architectural results. That is their intention; they should receive credit for it. And if we say that an open competition is one that we cannot sanction, we should go farther and say that we will not take part in it. We should not do that without very careful consideration, lest we give more color to the prevalent error that the American Institute of Architects is a trades-union. We should not do that unless we are prepared to go against the well-established practice of foreign nations in which architecture has been longer taught and is more systematically regulated than in this country. You will recollect that the most notable foreign competitions have generally been upon the open plan. That is the unquestionable foreign practice. And however the architects may feel about it, in France, Germany and England, public opinion there is inclined to maintain the system. The public believe that open competition, on the whole, results in securing the best designs. So, in any stand we take upon the subject, we must recognize the purpose of the public, the client, in instituting a competition, to so arrange it as to secure the best efforts of the best men and the best efforts of the unknown men—we were unknown men ourselves at one time—and that effort of the public is a legitimate and natural one, and cannot be secured in any way that I know of except by open competition. The competition in two stages, one stage of which is open to everybody, seems to

[1]The report itself was referred to the Board of Directors, and is not, as we understand it, to be printed at this time. Essentially, therefore, the Committee merely reports "progress."

be something like a middle ground. I am not prepared to discuss it at the present time.

I say, in pronouncing a condemnation: Go slowly; you are against the sentiment of the American people; you are against the received practice in Europe. You may be right. I hope you are. But, if so, you must make people believe it. Go slowly.

MR. I. K. POND:—I am thoroughly in accord with Mr. Coolidge, for I want the convention to take no action which would prevent the committee from making the study of this question and making the fullest report on competitions of all classes that is possible to formulate.

MR. WALTER COOK:—If I understand Mr. Hewlett's motion, it is to direct the committee to formulate certain rules with regard to open competitions.

MR. HEWLETT:—Not rules, but recommendations.

MR. WALTER COOK:—If we have a committee considering the subject, they had better consider it without recommendations from this convention. Let them formulate their recommendations and submit them to this body. But don't dictate to them what they shall do. I believe that an unlimited and open competition is not primarily injurious to any architect, for no architect is obliged to have anything to do with it, and he is not injured by an open competition. It is primarily objectionable from the point of view of the client rather than the architect, and if the committee should share that opinion they should express it without the direction to formulate and submit recommendations with regard to the measure which they may hold to be commendable from the point of view of the public.

MR. HATTON:—Open competitions are not approved by the American public. My own experience is the contrary. In private practice how seldom is it that a private party ever institutes a competition. It is only when there is a building committee or a board of directors that they institute a competition. And then the purpose of the competition is hardly to get a better design, but rather to see that certain architects may be given a chance. The committee think they are giving these architects an asked-for opportunity by allowing the competition. But, in the majority of cases, it is not a real competition or opportunity. They submit designs, but the committee considers the men. The roulette wheel is not fair. I do not believe it is the sentiment of the people, but the people think that the architects want a competition, and therefore they try to satisfy the profession in that respect.

MR. CRAM:—Would an amendment be acceptable to Mr. Hewlett providing that the question of open competitions be commended to the immediate attention of the Committee on Competitions, with the understanding that if they see fit they shall formulate such recommendations and forward them to the several Chapters? That leaves the matter in the hands of the committee without instructions. It places the whole thing where it belongs, with power to act if they see fit.

MR. HEWLETT:—It is not quite acceptable. The present report, which is expected to be the basis of the future report of the committee, disposes of the question of open competition in a way that the chairman of that committee, in speaking to me yesterday, characterized as a way that was intended to be of the utmost impertinence towards open competitions. Now, if that committee feel that way about it, and do not care to comply with these instructions, I would like to hear from them now. Because another reporter should be appointed who should, in spite of the feelings of the present committee, formulate something to regulate open competition. So I think a few words from the committee will entirely cover the ground, and, if they are unwilling, I would withdraw my motion and make another.

MR. ANDREWS:—This is exactly the kind of information the committee wanted to get. I am glad Mr. Hewlett has brought the question of open competition up. In my opinion, the statement I made to him was that we had disposed of the question of open competitions in a rather brief and effective manner in the single sentence we employed with regard to them. We meant to express our view of open competition as a business operation. We have said that open competitions are obviously of a purely speculative nature, and are therefore not to be considered as business arrangements. I have listened attentively to every argument on the matter that I can find, and there is nothing which leads me to see at the present any ground for changing that statement. If there is any manner of so conducting open competitions that they are not speculative in their nature, the committee will be very glad to find out what that method is. It is impossible for the committee to formulate any simple mode as requested, of conducting open competitions, because it does not know of any so conducted. I hope that the resolution will not pass, because it is of the first importance that a committee acting in this way should retain its intellectual freedom. It must report as it thinks is right and logical, and if such a request were made, and we find we cannot conscientiously draft any measure which would treat of open competition as requested, we should simply have to decline to do that. But I want to impress upon the convention that the attitude of the committee is one of absolute frankmindedness. We want to get all shades of opinion, because the question will not be settled until it is settled rightly and properly, and we get down to some bed-rock principle upon which all this determination can be reached. The report will be found to be consistent in its parts. Whether it was practicable or not was a secondary consideration. We wanted to state a truth or group of truths without any question as to whether they were practicable. I will suggest that the committee will be very glad to act as a bureau of exchange of views between members of the profession. For instance, if Mr. Hewlett will formulate his ideas of how an open competition can be made effective, and will send it to the committee, the committee will be glad to send it to all the members of the Institute who express a desire to receive such communications, and in that way we can carry on a debate on this subject all through the coming year, by having copied and sent back to the interested parties the communications received from all quarters throughout the country. It will be an exceedingly interesting parliament on the subject. The committee is simply an agency in this matter for registering the will of the Institute. It is not trying to put forward its own conclusions; it is a machine for the presentation of facts as presented to it, and the sifting and classifying of the facts into some coherent suggestion.

[Mr. Coolidge here took the Chair.]

MR. F. M. DAY:—There seems to be a certain consensus of opinion that if Mr. Andrews's committee is unwilling to approach the regulation of open competitions with a friendly mind, that then, in order that there may be a clear expression of the views of those who believe in open competitions, there should be some other group of men sympathetically working up the merits of that system and prepared to present them and whatever regulations they think necessary to bring out the methods in practice. You will understand that I am not expressing my personal opinion with regard to the merits of any system of competition. I merely urge—as there seemed by the applause here a considerable number of men who wanted that side carefully and sympathetically considered—the best way to have that done would be to let a small group of the advocates of the system work it up.

MR. CRAM:—That is a most sane solution of the problem, and I would substitute for Mr. Hewlett's motion that a committee be appointed by the President to investigate the entire question of the regulation of open competition, and to submit on its own part its conclusions to the several Chapters, with a request that each Chapter take action on the recommendations and forward their action to the Committee on Competition. This will then serve as a basis of action and judgment, and will indicate the consensus of opinion on the part of the Chapters, and will form a part of the report of the committee on competitions.

MR. LITCHFIELD:—I would second that, and call attention to the fact that we are forgetting the facts which led up to the appointment of the Committee on Competitons. The evil which made us feel that the appointment of such a committee was necessary was an evil connected rather with the limited than the open competitions. Numerous limited competitions had been held where the result desired by the client and the architects interested did not materialize. We have a code for the conduct of competitions which recognizes open competitions. It seems to me that that code should be the text of the operations of the new committee to be appointed, and the present committee should proceed to the consideration of the code they had prepared for submission to the Institute.

MR. MUNDIE (in the Chair):—They can make use of the code as a basis for the formulating of an agreement between the architects invited and the client, and it will be found of the greatest service. Then at the convention next year we shall know whether it is a working and a feasible code.

MR. ANDREWS:—We shall welcome any step that can be taken to thresh out the subject and get at the truth. We want to reach a finality, and I think the suggestion of Mr. Litchfield a good one, that there be presented to the committee in as strong a way as

possible what they conceive to be the working out of this open-competition question. The committee states frankly that from its point of view it does not see how the open competition can be anything but speculative in its nature, and if someone will prove to us that we are mistaken, or that some sort of compromise can be arranged, we will be very glad to know it. It is true we want some effective way for making what is right prevail, and the mind of the committee is absolutely open and without prejudice in respect to this matter.

Mr. Hewlett:—I accept Mr. Cram's substitute resolution in place of the original motion, but I wish to add that it appears to me that the substitute made by the committee is misleading. They have stated that the reason why, in their estimation, it is hopeless to regulate the open competition is because it is purely speculative. Now, what is a competition but speculative, unless every competitor is fully remunerated. Therefore, their reason to my mind is not a good reason.

Mr. O'Donoghue:—I fail to see how any regulation can be made for open competitions. They are always a pure gamble. I agree with Mr. Andrews completely, in that there can be no regulation for their conduct as long as there exist in this country any group of men who wish to institute a competition, and through ignorance do not know how to set out about it. They will institute an open competition. They have no knowledge of our professional ethics. Therefore, the open competition is bound to exist. We may make as many regulations as we please, but it will exist, and, as open competitions have resulted in the very best results, younger men have had a chance. It is like a ticket of entry to a closed yard where certain people can play, but there is a large back lot where a lot of people would like to play, and it is not quite fair to close that lot.

Mr. A. B. Pond:—There should be a provision in the report for a thoroughgoing, clear discussion of the place of open competition in architectural practice. They should consider not merely the attitude of the architect of long-established practice, but of the young man; and, further than that, consider the fact of open competition upon the evolution of architecture. I think it may be conceived that open competition does infuse new life into a practice which may have become somewhat straitened and fixed, and it is by competition that the younger man can find his opening into the larger work. I do not approve of competitions for private purposes. Our firm rarely enters a competition of any sort, yet I conceive it would be unfortunate if the younger men were entirely debarred from their chance for the large work. The human race has reached its present position as the result of sharp competition. We call it the survival of the fittest. Men are weeded out if found inefficient. A clear discussion not based on the comfort or convenience of men who may have become established, but upon the results on the entire profession, will be valuable. I do not know whether we can fix regulations for open competitions, but let us see if they have a legitimate place, and if so, what? Is it as a final competition, or simply to pick runners? Questions of that sort should be discussed in a broad way, before attempting to make clear regulations on the subject.

Mr. Hopkinson:—I have failed to hear in this whole matter that it should be an endeavor to educate the public in the belief that the members of the Institute stand ready to help the public to that which is good in architecture. We have about us all the business men of standing. I cannot imagine how in most cases any open competition can exist without some member of the Institute being located so that he might be of some service to the profession. He could go or send someone who could say: Cannot you agree that all drawings shall be sent in on the same scale? And that all drawings shall be sent in on the same day, and not three or four days after? The Institute should be willing and glad to make every one of its members a missionary to assist the public in what is an honest endeavor to promote the welfare of architecture. And I should be sorry if we could not go with some of the authority of the Institute and urge the public to take a little advanced stand in this way. I hope the idea of Mr. Hewlett and others will prevail.

Mr. Warren:—We are in danger now, as we have been in the past, of considering what we would ideally like to see, rather than what is practicable. The open competition exists, and cannot be done away with. Is the Institute prepared to refuse all recognition to that form of competition, or will it try to regulate it so as to make it the best possible competition of its kind? It seems to me that so long as members of the Institute in good standing and considerable practice are willing to go into open competitions, which border on an irregular scramble, as described by the last speaker, it is futile to discuss the matter from the point of view of the committee. An instance may point out clearly what I have in mind: I was called to advise in the case of a competition, which was established and was under way. I was called to advise the committee in their selection of a design. The programme was so loosely drawn, so wretched in character, that I wondered whether I should have anything to do with it. But I concluded it was the kind of missionary work the last speaker mentioned. I wrote the committee a strong letter as to the kind of competition they had established, stating under what conditions I would advise them. Much to my surprise they invited me so to help them. And it appeared, when I met the committee, that they were sincerely anxious that the right kind of competition should be held; but it was really a wretched open scramble into which I had been able to inject only a small amount of order. I did succeed in getting the committee to act on my suggestion in the selection of a design. When the competition was all over I was surprised to find that one member of the Institute of some prominence had taken part in this scramble, and I was also amused to find that among the other competitors were two young men in my own office. And that is the sort of thing that members of the Institute subject themselves to, to trials with young men, perhaps hardly more than office-boys. Until the Institute is willing to take the stand that it will not permit its members to enter that kind of a wretched scramble, it is futile to discuss competition. The Institute should state a certain minimum of decency, which if overstepped will subject the member to discipline. Before we do that, I do not think we shall accomplish anything of very practical value.

Mr. Laird:—I will say that, so far, I have seen only evil in unmixed competitions, and it has seemed to me almost impossible that any good should come out of them.

A Member:—Mixed or unmixed?

Mr. Laird:—I mean absolutely open, wide open. I would exclude the limited or the mixed competition. What I say as to the evils of competition applies to the wide-open competition which is rarely more than an ill-regulated, misjudged, free-for-all scramble. It seems to me the duty of the Institute, as well as its interests, to seek some way of mitigating the evil, if not of regulating it.

Mr. Cram's motion as amended by Mr. Stone is adopted.

REPORT OF COMMITTEE ON ARCHITECTURAL EDUCATION.

THE problem of architectural education is so important, so far-reaching, and marked by such intricate ramifications, that we have been able hardly to do more than state the case, leaving to the committee of next year the more detailed study and the formulating of clearer inferences and conclusions.

It is an interesting fact and worthy of record, that this committee, made up of superficially diverse types, has found itself absolutely unanimous even in matters of detail. After some months of individual study, the chairman asked each member of the committee to embody his conclusions and recommendations in the form of a tentative report. Such reports were received from Mr. Carrère, Mr. Kendall, Mr. Sturgis and Mr. Trowbridge. These were examined at a meeting of the committee and, with the report of the chairman, were found to be identical in spirt and in matter. It would seem, therefore, that under the appearance of diversity, there is a body of profound and unanimous conviction that argues well of the architectural profession in America.

In order to establish a basis of judgment, we fixed first of all upon working definitions of architecture and of an architect.

Architecture we defined as a Fine Art with three aspects: as a manifestation of pure beauty, as an enduring and trustworthy language that voices the existing best in civilization, and as an exact science through its structural relationships.

An architect we defined as one ranking in the class of men of culture, learning and refinement, differentiated from the others of his class solely by his function as a creator of pure beauty, as an exponent through material forms of the best secular, intellectual, and religious civilization of his time, and as an organizer and director of manifold and varied industries and activities.

From these assumptions, it follows necessarily that the object

of architectural education must be the breeding of gentlemen of culture, learning, and broad sympathies, who understand the dignity and the significance of Art both as beauty and as language, who are perfectly proficient in the technique of the art they follow, and who can inspire, organize and direct widely different classes of men.

Such was our view of the general situation and our unanimous conviction as to the essential nature of any sound system of architectural education. Examining the various agencies in America in this light, and that we might see how nearly they approached, severally and in mass, to the principles indicated above, we found them to consist in two forms, viz.: first, the Elementary, *i.e.*, the "architectural classes" connected with public instruction and philanthropic societies, and also the "Correspondence" schools, and second, the Academic, *i.e.*, the regular schools of architecture; the voluntary combinations under the control of certain groups of architects, such as the independent ateliers, and the *concours* of the Beaux-Arts Society, and the American Academy in Rome.

The Elementary systems we have been compelled to disregard for the time being, but we believe they demand the closest scrutiny, for while they may give a certain plausible dexterity to boys ambitious of becoming architectural draughtsmen, they cannot be considered as systems of education, since their methods are superficial and rudimentary, the taste they inculcate frequently questionable, while they do nothing towards creating the basis of broad, general culture which is absolutely and primarily essential. Furthermore, we believe that these elementary systems may, and in some cases do, accomplish serious harm through inducing boys temperamentally unfitted for one of the most noble and exacting professions to throw themselves into an impossible career through misrepresentations to the effect that "architectural drafting" is only a trade, to be acquired as easily and by the same methods as stenography. We believe the Committee on Architectural Education may be of great assistance to the elementary schools, and indirectly to the architectural profession, by volunteering its friendly services in an advisory capacity, and we commend both this, and the close study of the systems themselves, to our successors in this committee.

The Academic agencies may be divided again into two categories: one made up of those which aim to give a complete and final education, viz., the regular Schools of Architecture, supplemented by the Roman Academy; the other of those whose object is to develop, through a special insistence laid on certain points, necessary elements in the equipment of an architect which students and draughtsmen have been unable to acquire satisfactorily through their collegiate or practical experience, viz., the ateliers, the "club" classes, and the *concours* of the Beaux-Arts Society.

Now it is evident to us that none of the systems named above, is in itself, and independent of all other agencies, able to produce the combination of general culture, good taste, instinct for beauty and executive ability which make up the ideal architect. The architectural schools should, by their general training, do much towards the creation of broad and inclusive culture; they must ground the student in the history of art and civilization and the correspondence between these two things; they will give him his fundamental knowledge of the essential elements of architecture as an art; they must enable him to lay the broad foundation on which he is to erect his superstructure of professional capacity; but the crucial point, the development of good taste and the instant sense of beauty, they cannot touch through the scholastic agencies now marshalled to this end. We are unanimously of the opinion that this passion for beauty and this instinctive good taste may be inculcated, if at all, not through the methods of scientific pedagogy, but by the close personal relations and the keen enthusiasm that arise through the association of a group of students with a practising architect, chosen by the free will of the student because of admiration for, and sympathy with, his principles, his personality and his achievements.

With the advantages of the atelier system comes a corresponding danger, that of a feudal following of one strong personality and an unconscious exaggeration of his peculiar theories and methods. This danger is counteracted by the system of general competition between the students in the several schools and ateliers, where each man, as representing each system or impulse, finds himself on a field of battle where individualism is put to the test and stands or falls by just so far forth as it has acquired universality.

This combination of the atelier and the concours is to a large degree the method introduced and followed by the Beaux-Arts Society, and we believe it essential in any scheme of architectural education; but so long as the atelier system is purely voluntary, and so long as the concours are conducted by a group of men without official status, and bound together by the traditions of one particular system and nationality of training, there is always the danger of an unwholesome predominance of one set of ideas, to the unintentional exclusion of others of equal value but of different origin. Such competitions conducted exclusively by advocactes of Gothic or of Art Nouveau might conceivably defeat their own just ends.

Believing, therefore, that these two features of the atelier and the general competition are essential elements in any complete scheme of architectural education, and that to have their fullest effect they should become a part of the curriculum of every architectural school, we urge on the several schools the wisdom of action to this end, and on the Education Committee of next year consideration of the question how a scheme of general competitions similar to those now conducted by the Beaux-Arts Society, but official and universal, may be brought into existence.

In scrutinizing the several schools to ascertain in how far each seemed to be working towards the development of the typical gentleman of general culture with special architectural ability, and acting on a unanimous opinion that design can best be taught, at least in its higher aspects, only through the personal influence of practising architects, while the instinct for beauty may be best developed by personal contact with those who already possess this instinct and the power to communicate it, we took the ground that the work of the schools should be considered primarily as a means towards the development of a man of general culture, and as an agency for establishing sound and basic principles of art, which, through intimate contact with architects themselves, should be developed to their highest estate.

Working on this basis, and using for purposes of general comparison the tables printed by the Committee on Education of the Architectural League, we found surprising variations as between six of the principal schools of the United States. * * *

While the tables referred to above should be used only as a basis for the most general deductions, we are convinced that they show indisputably that our schools are weakest in providing what we have called general culture. * * * We desire, therefore, to urge on many of our architectural schools consideration of the question, whether they may not, advisably, diminish the stress now laid on purely technical education and strengthen that placed on all that tends toward general culture; and on those schools, where, in the tables of the League the points credited to æsthetics fall below 30, consideration of the possibility of strengthening themselves in this particular direction.

So far as education in design is concerned, we found that the atelier system had been accepted in its entirety only by Columbia, while Harvard had introduced a modification that was working well, and seemed to us very significant. Participation in the concours of the Beaux-Arts Society was authorized by the University of Pennsylvania, Syracuse, Cornell, Washington University, St. Louis, and the Massachusetts Institute of Technology.

There is every reason to be encouraged by the present system of architectural study at Columbia, which has been recently reorganized on thorough-going "University" lines. Here the course is not divided arbitrarily into years, but into grades, and in each the student must acquire a given number of credits before passing to the next higher. Students are required to carry on their work in design in some one of ateliers or studios officially recognized by the University. A choice of two courses is offered, one for the Bachelor's degree, the other for a Certificate in Architecture, the requirements for the former being more severe, while in the latter a course in structural design is offered in place of mathematics and engineering. Graduates of this school may pursue their studies in advanced design and research in foreign schools of architecture; the programme consists in one major and two minor subjects: the first is one of design, and through an arrangement with France, is pursued in an atelier connected with the School of Fine Arts. One of the minor subjects implies travel or library work, the other is in the line of general culture, the courses at the Sorbonne being available, by arrangement.

It seems to us that the question has been taken up at Columbia with the broadest view and is being worked out logically and with every prospect of admirable results.

There are two points at Harvard that seem to us particularly noteworthy: the broad and lucid manner in which the theory and history of art are being taught, and the recent adoption of a modified atelier scheme. Four architects of established reputation set, in succession, problems in advanced design; each criticises the working out at more or less frequent intervals during the space of a month, and in the end renders judgment. This seems to us a step in the right direction, though by no means to take the place of the true atelier system. It is, however, an indication of one way in which architectural schools that, unlike Harvard, are at a distance from the large cities, may acquire something of the indispensable element of personal influence on the part of practising architects.

In our investigation of the subject, many questions have suggested themselves as worthy of serious consideration. We do not feel that our data justify us in making a specific report on these matters, but we name them and commend their consideration to our successors in this committee.

They are as follows:

What do the schools teach as to the expressive function of Art in general and Architecture in particular, *i.e.*, as to Art as an index of civilization, standing high or low in exact relationship to the civilization that brought it into being?

What is the attitude of the several schools towards the various styles, *i.e.*, do they all, or any of them, teach that there are one or more styles which are sound and logical, while there are others which may or may not be interesting from an archæological standpoint only? If so, what?

What is taught as to the relationship between construction and function on the one hand, and design and decoration on the other, *i.e.*, is this relationship clearly brought out in the case of Classical, Byzantine, Romanesque, Gothic, Renaissance and modern architecture, or is it ignored, each style being considered as an abstract thing, regardless of its aspect as a manifestation of the close community that must obtain between function, construction, design and decoration?

What are the criteria of judgment of design in the several schools, do they vary, and if so, to what degree?

How much attention is given to the question of presentation in each school? And is there apparently an undue amount of time and labor given to this in certain schools, an inadequate amount of time and labor in others?

In view of the fact that the practice of architecture is rapidly becoming so specialized that it is apparently necessary that a student should decide at the outset as to whether he should follow the æsthetic or the structural line of work, is it not desirable that the schools should divide their courses in such a way that a student might elect which one he would follow, artistic or structural, there being in the case of the former a maximum of æsthetic instruction and a definite minimum of structural education; in the latter a maximum of structural education, a definite minimum of that which is in its nature æsthetic?

To give a general résumé of our conclusions, we report as follows:

The object of all education is to make more effective units. For this the fundamental equipment is that knowledge of the language, literature and history of his own country as will enable one intelligently to take advantage of opportunities; and such knowledge of the literature and history and art of other countries as shall give a broad general knowledge of what civilization is. The possession of this knowledge is what is meant by cultivation.

When a man adopts a special branch of industry and thus limits his useful effectiveness to a distinct field, special training and knowledge are required in addition to general cultivation, which nevertheless remains the fundamental essential.

Schools of architecture are established for the purpose, first, of insuring the pupil in the possession of general cultivation; second, to give him a thorough technical equipment in the history and literature of architecture and in the laws that have been established by precedent; this, to make him familiar with present conditions and practice. In no one of these fields is his study completed in the school; he is simply started in the right way. In general cultivation and in a knowledge of the history of architecture it is essential that the student should be fully equipped, while his acquaintance with methods and practice may be, and indeed will be, largely acquired later.

It is on the first two then, cultivation and the theory of design, that attention should be centered. Admirable as our schools are, it can do no harm to emphasize the point that they are training men to be intelligent architects, not skilled draughtsmen, and that manual dexterity is dearly bought if it is at the expense of intellectual equipment. Skill can readily be acquired with practice; nothing in practice quite takes the place of sound school training.

The school should give the student a thorough grounding in the great architectural precedents and their application, and an intelligent understanding of them so that he may know why they became established and to what extent they meet modern requirements.

Of prime importance are the Classic orders, not for what they are in themselves, but because they are the terms, the language, in which a very large part of our architectural heritage is expressed. With a thorough knowledge of the orders and their application in Greece and Rome, one is in a position to understand the varied expression of the Renaissance in Italy, in France, in England, in Spain and in her American possessions, and here in the United States.

Almost if not quite equally important is the knowledge of Christian architecture; the whole development that followed on the fall of the Roman empire, and which, through Syrian, Byzantine, Southern Romanesque and Norman finally culminated in the wonderful architectural monuments of the Middle Ages. The one is the history of a great intellectual and sensuous movement, the other of a great spiritual movement. In both is the sense of beauty very marked, in both is construction recognized as the basis of all good architecture.

The knowledge of these things is fundamental for the education of the architect; ability to apply the knowledge is essential for practice. The student may learn *how* to apply his knowledge in the school, even though the real application of it comes later. It is in teaching the student how to apply his knowledge that the architect can be of real use to the teacher. The man in constant active practice, to whom the school is but an occasional occupation, brings to his work a spirit, an enthusiasm, a point of view, which are essential for the development of the critical faculty.

We believe that the more important work of the school, general cultivation, and the theory of design, which can best be taught by the trained teacher, should be supplemented on the less important side, the practice of design, by the active assistance and coöperation of the architect.

If this is to be done in the most effective way, unity both of aim and of action is desirable for the principal schools of architecture, so that those in charge, who are necessarily most familiar with the work, themselves may determine on the best methods.

This unification we are almost inclined to consider the crux of the whole matter. Important as they are, methods must be secondary to impulses. At present, it seems to us, not only does the idea of general culture as the indispensable basis, fail of its due recognition—the general tendency being towards the development of the specialist, or savant, rather than of the well rounded and cultured personality with a special equipment for architectural expression—but architectural education in the United States tends towards an undue individualism and centralization on the part of the several schools. Educationally, the architectural profession seems to be in about the position of the thirteen Colonies before the adoption of the Constitution—even before the ratification of the Articles of Confederation.

We believe that, on the whole, architecture is being taught in America with a broader view, and in certain respects more effectively, than in any other country. Through coordination, a unification of standards, and cooperation, we believe that in a few years the education offered in this country might be looked upon as final, except for the absolutely necessary element of study and cultivation through travel and research amongst the inimitable monuments of the pagan and Christian past. We object to considering our own schools merely as feeders for the Schools of Fine Arts in Paris, and we look forward to the time when a great post-graduate course shall be possible in America through a great central School of Fine Arts in Washington. To make this possible, we must first of all achieve a certain amount of coordination, unification and cooperation between all our now somewhat aggressively independent schools, and we believe that the first step in this direction would be the acceptance by all of the principle of general competition, and the establishing of an official, central and representative body that should put this principle into practice.

Ralph Adams Cram,
Chairman.

REPORT OF COMMITTEE ON SPECIFICATIONS.

THIS Committee was appointed in the middle of February, 1906, and has therefore been in existence nearly ten months, and was appointed under a resolution directing it to consider the subject of Standardizing the General Conditions and other parts of the Specifications as used throughout the United States, and if deemed feasible to prepare standard forms therefor, and in general to advance the subject of specification-writing, with the further instruction that they should submit their work from time to time to the Board of Directors, the Executive Committee, and the several Chapters of the Institute, and finally after their criticism and revision, to the Fortieth Convention of the Institute for adoption.

Your Committee respectfully submits, however, that it has found it quite beyond its powers to fulfil the latter part of the instructions given it in the above quoted resolution, and regrets to say that, for various reasons, it seems unwise to do more at this convention than to report progress and give some general outline of what has been accomplished, and the work remaining to be done, before it can properly and wisely submit a final report for the criticism and adoption of the Institute.

The Committee as orginally organized was composed of Mr. Pond, of Chicago; Mr. Baldwin, of Detroit; Mr. Ferguson, of Boston, and Mr. Boring and Mr. Atterbury, of New York. The fact that its members represent the practice of widely different sections of the country, while increasing the value of its work, has also increased the difficulty of making rapid progress, where, as was soon found to be the case in this work, the subject could not properly be sub-divided and worked upon simultaneously by its various members.

The course pursued has therefore been in general as follows:

After obtaining from some twenty-five of the leading architects throughout the country, copies of their general clauses and contract forms, the Committee held a meeting in New York and adopted a tentative arrangement or index covering all the subject matter contained in the various specifications submitted, and Mr. Pond, of Chicago, very generously undertook the laborious task of collecting, copying and arranging this material in accordance therewith. This resulted in a volume containing some hundreds of clauses, and at a subsequent session of the Committee, also held in New York early last summer, a plan of elimination and a general constructive principle was adopted.

In accordance with this the next step in the progress of the Committee's work was taken, and during the summer months a revised edition was made in my office, in which, as far as possible, duplications were eliminated, and the entire text reduced to the briefest possible terms, which resulted in a skeleton or digest of all the material originally collated by Mr. Pond.

Working with this revised or skeleton edition, and with the aid of Mr. Heins, of Albany, newly appointed by the President to aid the Committee in the absence of Mr. Boring abroad, the New York members of the Committee are now engaged in eliminating and arranging the material preparatory to submitting a third revision for criticism by the entire Committee. Not until after this has been done, does your Committee feel that it would be wise to submit any of its work for general criticism, either by Chapters or individual members of the profession, however, valuable such criticism will undoubtedly be at the proper time.

Your Committee begs the leniency of the Institute in criticising what must appear to be very slow progress in this work, but the conditions which it found to exist have rendered its labors extremely onerous. At the same time, with every step, I believe, the majority of its members have felt more and more deeply the necessity of its work, and the vital importance of at least attempting to establish some general system and order in place of the chaotic conditions apparently existing to-day in this department of our professional practice throughout the country.

While the scope of the work originally outlined by the resolution appointing this Committee does not appear to include on its face any question as to form of contract, it nevertheless became almost immediately evident to your Committee that not only the contract, but certain other printed forms, such as "Proposals" and "Letters of Instruction to Bidders," were inseparably involved in any thorough and logical study of the General Clauses of the Specifications. Your Committee has therefore found it necessary to study the various forms of contracts employed throughout the country by representative practitioners, and the relations between such instruments and the General Clauses of the Specification.

All this work has, and will involve considerable expense for clerical assistance and printing, and while these expenses have been guaranteed to date by the members of the Committee themselves, it would perhaps be proper for the Institute to consider the matter of expenses, especially in view of the probable necessity of our asking legal advice before the labors of the Committee can be satisfactorily completed.

Respectfully submitted,

GROSVENOR ATTERBURY,
Chairman.

REPORT OF COMMITTEE ON SIGNING BUILDINGS AND USING INSTITUTE INITIALS.

THERE has been so little uniformity in the practice of signing buildings by architects, not only in this country, but in others, that your committee finds only a small amount of material from which to draw conclusions for this report.

The questions seem to have been settled, probably by gradual custom rather than discussion, for the allied arts of painting and sculpture, so that one can usually find the artist's or sculptor's name placed in some inconspicuous way upon even unimportant work. This has been true for so long a time that apparently the question does not arise as to the propriety of the usage.

Why this is not also the custom with architects is not well understood. No sculptor would place his name upon a copy of his work made by another, no matter how perfectly his ideas were reproduced, and it is possible that the fact of the execution of an architect's design by others than himself may have led unconsciously to a distinction between his finished product and that of a sculptor. The question is purely speculative and why the distinction has existed in the past is probably unimportant. But the fact that it has existed should make us hesitate before lightly recommending to architects that they place their names upon their buildings.

Even the best of painters will probably sign in some manner a rough pen-and-ink sketch. Let us not therefore hasten to do the same. The pen-and-ink sketch is completely the author's work no matter how unimportant, while the architect's stable may be so largely infused with the practical reasonings of a somewhat unimaginative coachman, that it becomes difficult to determine how much of the result belongs to his genius and how much to that of the designer. Clearly at one end of the scale the architect will have no desire to immortalize himself. If, on the other hand, the work is important and of a public character, the practice would probably be recommended without argument.

In any attempts that we make toward a classification of buildings, it will begin to become difficult to know how to draw a line, after we have left the public and semi-public type of buildings. There will be many small and almost private pieces of work upon which the designer will rightly desire to subscribe his name, and on the other hand many buildings, important as regards size, that should be credited more to the engineer than the architect.

The question in general seems to have been under discussion in England, for we find the following in the Royal Institute "*Kalendar*" for 1905 and 1906: "*Resolved*: That it is not derogatory to the profession for an architect to sign his buildings in an unostentatious manner similar to that adopted by painters and sculptors."

This expresses well the general thought that there can be no impropriety, if an architect wishes to make use of this custom. But let us respect the fact that it has not been very generally done and let the custom of doing so come gradually and not by proclamation. If any piece of work is good and very good, both in design and execution, the architect deserves to have his name placed upon it. It would be impractical to have the exercise of this right passed upon by proper and competent committees, so he must decide for himself. But let him look upon it as a privilege and use it sparingly.

Your committee was further instructed to report information in regard to the use by architects of the initials F. A. I. A. and A. A. I. A. upon letter-heads and drawings. English architects make use of their proper titles almost universally, while in this country the members of the Institute, for some reason, do not do so. In fact, less than two per cent. have this custom. The American people are inclined to suppress such superfluous letters after their names, and hesitate over the explanations that may follow as to what they all mean. And that indicates the fact that there are too many who do not know, as we wish they did, what they do signify.

This is a condition which needs a remedy and toward that end we recommend that all members of the Institute inaugurate this custom which can only be for the furtherance of the recognition which the organization must have.

Respectfully submitted,
ABRAM GARFIELD,
Vice-Chairman.

THE EARLY HISTORY OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE following interesting paper by Mr. Alfred Stone, F.A.I.A., of Providence, was read during the session devoted to ceremonial exercises:

WE are here to devote this day to commemorating the memory of the founders of the American Institute of Architects and to consecrate ourselves anew, in the words of our first President, to the effort to make the Institute realize its noble ideal, and, so far as our providential opportunities will permit, promote its objects, which have, from the first, been declared in its Constitution to be "to unite in fellowship the architects of this Continent [now—"of the United States of America"], and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession."

In the very short time allotted to me, I can only hope to touch upon a few points and bring back to your memory something of the early history of the Institute and reminiscences of a few of the noted men who blazed the path and prepared the way for us and for those who are to come after us—most of the former have joined the great majority, but a few of them are still with us—surviving pioneers of that vast multitude who are shaping the artistic expression of this marvelously growing country as it builds its homes, its factories and its workshops, its school-houses and churches, its court-houses and its state-houses, its post-offices and other national buildings—mere passing allusions, leaving you to fill out the details and complete the picture.

We have announced upon our programme that this is the fiftieth anniversary of the formation of the American Institute of Architects. We might nearly as appropriately have called it the seventieth, as an organization was formed with twenty-three professional, two associate and twenty-five honorary members for the advancement of architectural science in the United States, under the name of the "American Institution of Architects," in New York, on the 6th of December, 1836. It met at the Pennsylvania Academy of Fine Arts on the 2d of May, 1837, adopted a constitution and by-laws and elected officers; but it was found impossible to keep up the meetings with any regularity, and, as a consequence, it went quietly to sleep, and, like Rip Van Winkle, slept for twenty years, while the United States kept on growing, building railroads and making it easier to travel.

With this growth and ease of communication, the desire among the architects to get together and affiliate one with the other was revived, and on Monday, February 23, 1857, the unlucky number of thirteen—all of New York City—met in the office of Richard Upjohn to consider the propriety of organizing a society of architects. They invited thirteen others of New York City, three of Boston and two of Providence, to join with them in framing a constitution and by-laws and found the American Institute of Architects—or, shall I say revive the American Institution of Architects—under the same name, except that Institute was substituted for Institution.

This assumption that the Institution and the Institute are one and the same body is more real than fanciful, as by the by-laws of the Institution its officers continued in office until their successors were elected, and those surviving continued to represent the Institution to the year 1857, when the original Secretary, Thomas U. Walter, handed over to the newly elected officers the records of the original association.

The architects who met at the Astor House, December 6, 1836, to form an association appointed Alexander J. Davis, Chairman, and Thomas U. Walter, Secretary (whose names are inscribed with the founders of the Institute), and in addition there were present Isaiah Rogers, Charles F. Reichardt, William C. Kramp, F. Schmidt, Thomas Thomas, and Thomas Thomas, Jr., of New York, William Strickland and John Haviland, of Philadelphia, and Richard Bond, of Boston.

Letters favorable to the movement were received from Ithiel Town and Minard Lefeore, of New York, Asher Benjamin, Alexander Parris and William Sparrell, of Boston, John C. Trautwine, of Philadelphia, Robert C. Long, of Baltimore, Ammi B. Young, of Vermont, and James H. Dakin, of New Orleans—worthy associates of the founders whose names are inscribed upon the tablet which we are this day to unveil.

The constitution and by-laws of the Institute were engrossed upon parchment and signed by those present at a meeting held on the 15th of April, 1857, the others subsequently adding their signatures, and on the 5th of May the first meeting of the American Institute of Architects, under the constitution and by-laws, was held and new members were elected.

During the year '57, fifteen names were added to the roll; in '58, seven; '59, five; '60, seven, and '61, three; making a total of sixty-seven original and elected members, but of that number nine did not qualify. Of the fifty-eight who did qualify a goodly number entered service in the army to take part in the Civil War, which at that time so engrossed the country and disturbed normal conditions that for three years no meetings were held, and no members were elected. To quote from a former Secretary, "it disbanded though it did not disorganize."

In 1864 signs of the end of the struggle were becoming evident, the North was in a prosperous condition and building industries were again active, and those of the original members who could be gotten together revived the Institute, held meetings and elected new members—twelve in '64; three in '65; nine in '66, and seven in '67, the year of the formation of the New York Chapter and the year of the first Annual Convention, which was held in New York City on the 22d and 23d of October.

Of the fifty-eight who qualified as members previous to suspension of activity, because of the Civil War, I find thirty enrolled as active members in 1867, that seventeen of the thirty were included in the thirty-one original members, and that Charles Babcock and George Snell had been elected Honorary Members.

During all these years Richard Upjohn stands out prominently, not only because he was the continuous President of the Institute (from its later inception) for twenty years—from '57 to '77, but because he was recognized as one of the foremost, if not the foremost, architects of his time.

Of him at the annual convention in 1875, Mr. Van Brunt, who occupied the chair by reason of the increasing infirmities of Mr. Upjohn because of his age, says:—"To those of us who remember Mr. Upjohn as he performed this grateful office in the earlier conventions and can recall the simple dignity of his appearance and the affectionate respect which his utterances commanded, I need hardly say that I am oppressed with a peculiar sense of insufficiency as I rise in his place. The spirit of concord and good-fellowship which in our younger days was in great part created by the personal influence of the father of American Architecture by his conciliatory manner, his generous sympathy, and his wise counsel, still remains to us and bears fruit a hundredfold."

Dr. Thomas U. Walter delivered a memorial address at the second annual convention, held in New York in November, 1878, three months after Mr. Upjohn's decease, in the 77th year of his age, in which he tells of Mr. Upjohn's coming to this country from England when he was twenty-seven years old, of his working at his trade as a cabinet-maker in New Bedford, Mass., devoting his evenings to the instruction of a class in drawing, removing to Boston four years later, working in the office of Alexander Parris—to whom I have before alluded—and, soon after, beginning business on his own account against difficulties and oppositions that were continuously besetting him until, six years later—in 1839—he went to New York to take charge of alterations and enlargements of Trinity Church, which, however, were finally abandoned and the site cleared for the erection of the present building, by which he is probably best and most widely known.

I have not time to recall the distinguished work which he left behind, a monograph on which and on his life should be prepared by some one who knew him, for the knowledge of his personality and of the work he executed will soon be forgotten. Unfortunately it was not then and it is not now considered proper for an architect to sign his own creations, as does the painter and sculptor, and—I may add—the distinguished Building Committee!

In 1876, Mr. Upjohn's son-in-law, Mr. Charles Babcock, attended the annual convention in Philadelphia and brought to it a message from Mr. Upjohn that he was not able to fulfill the active duties of President and could not allow his name to be presented to the convention for re-election. Dr. Thomas U. Walter was chosen his successor, and was thereafter re-elected for ten consecutive years, dying on the 30th day of October, 1887, within ten days of the adjournment of the annual convention, at which his successor, Mr. Richard M. Hunt, was elected.

Dr. Walter was born in Philadelphia in 1804; consequently he was 83 years of age when he died—the oldest practising architect in the United States. He entered the office of William Strickland when he was but fifteen years old, became an expert draughtsman and acquired a general knowledge of architecture, after which he resumed his studies—mathematics and the physical sciences—and also drawing, mechanical construction and painting in water-colors. Returning to Mr. Strickland's office when he was twenty-four years old, he remained there two years, and in 1830 began practice on his own account and built the Philadelphia County Prison. (Is that the famous Eastern Penitentiary?)

Time will only permit me to say that his early work shows the influence of the Greek Revival, especially in the "Girard College for Orphans," a good preparation for his masterpiece, the Extension of the National Capitol and the erection of its majestic dome. It seems particularly appropriate that he should, as it were, inherit the task of completing the Capitol, as he was a pupil of Strickland's, who was a pupil of Latrobe's—the architect of the original Capitol—who in turn "clothed Thornton's skeleton with sinew and muscle and beauty."[1]

Just a few days before the death of Dr. Walter, his close friend and perhaps the most beloved by the greatest number of his own profession—Richard M. Hunt—was elected President of the Institute, assuming office on January 1, 1888, and continued its President until the consolidation with the Western Association, and for two years thereafter.

Those who were present will recall the stormy episodes of the Consolidation Convention, held in Cincinnati in 1889, and will recall how near the Institute came to committing hara-kiri. My friend, Mr. Scofield, could tell you of the long conference which Mr. Hunt, Mr. Scofield and myself held with General Cox while the rest of the Convention were busy at luncheon, carrying with us to the evening session the legal opinion of General Cox, "that if the prestige of age, etc., as well as the corporate rights, etc., of the Institute are to be saved it must be done by keeping its organization continuous by receiving the members of the Western Association into it and amending its constitution and by-laws in accordance with the agreed scheme,"[2] thus upsetting some of the ill-considered work of the morning and saving the life and procuring the continuity of the Institute. Neither will they forget the scene near the close of the morning session of the second day when, before proceeding in regular order to ballot for officers, Mr. Carlin, late President of the absorbed Western Association, proceeded to read a letter from Dankmar Adler, regretting his enforced absence as he would be deprived of the privilege of nominating Mr. Hunt as President of the enlarged American Institute of Architects; whereupon Mr. Carlin himself made the nomination, which received many seconds, and when put to vote was responded to with such a storm of ayes and long-continued applause, that a space of considerable time elapsed before Mr. Hunt, with stammering voice and tears streaming down his cheeks, arose to speak, but was obliged to sit down, and again arose and returned his thanks, ending with "I will do all that I can to aid in carrying on the good work of the Institute—of the union that has now been consummated, and let us hope that it will be fruitful of good work in the right direction, and that it may be everlasting. And I think I express the feelings of everyone present in saying, 'So say we all.'" He was again elected President and served through 1891, when, by the limitations of the by-laws, he became ineligible for re-election.

Doubtless the present by-law, that after serving two years one is ineligible for election as President, has its advantages, outweighing, perhaps, its disadvantages, but some of us older men look back upon the twenty years of Mr. Upjohn's Presidency and the ten years of Dr. Walter's, and sometimes feel how fine it would have been to have continued Mr. Hunt in office until his death in 1895, to be followed by Mr. Post, not for three years only as the Institute demanded, but as long as his strength and vigor would permit. But fine as it would have been, had such been the law, we should have lost the charm and grace of Mr. Kendall's incumbency, the equal grace and felicity of Mr. Peabody's, the sturdiness of Mr. Burnham's, the tactfulness of Mr. McKim's, the freshness of Mr. Eames's, and the activity of our present presiding officer. Our sober second conclusion, therefore, is not that we would love less to keep our strong men for a long time in office, but that we love more to give our younger men a turn at the helm and thus distribute our honors, avoid drifting into ruts and insure an infusion of new life and change of methods into the administration of our beloved Institute, to which each and all of us should show our loyalty.

Although the Institute had but two Presidents in the first thirty years of its existence—that is down to the year when it was decided to consolidate with the Western Association—it had eleven secretaries, beginning with R. M. Hunt, followed by Henry Van Brunt, before the war; C. D. Gambrill served three years after the war, followed by F. C. Withers, Russell Sturgis, who each served one year; P. B. Wight, three years; Carl Pfeiffer, two years; A. J. Bloor was elected in 1873, and served in that capacity, though not consecutively, for ten years, down to 1889, when John W. Root was elected at the Consolidated Convention. Mr. C. F. McKim was elected secretary in 1877, followed by Mr. H. M. Congdon, who served two years. In the middle of the year 1883 Mr. George C. Mason, Jr., was selected by the Trustees to fill the vacancy caused by the resignation of Mr. Bloor on account of ill health. Mr. Mason served for three years, when Mr. Bloor was again elected and served through the Consolidation Convention.

Mr. R. G. Hatfield was its first Treasurer, and rendered most faithful service for twenty-two years, until his sudden death in 1879. His brother, O. P. Hatfield, was elected his successor, and held the office until the consolidation in '89. S. A. Treat was elected his successor and retained the office until the establishment of our headquarters in Washington in 1898, when the two offices—secretary and treasurer—were combined.

I have been able to give you only a mere outline of the history of the first thirty-two (or fifty-two) years of the Institute, that is, down to the time of the consolidation with the Western Association. I would like now to give some reminiscences of the early conventions and of a few of the men who took active part in its work in those early days.

At the first annual convention Mr. Upjohn said that he would not "discharge his full duty to the younger professional members, if I omitted to allude to general competitions—a sorry subject for architects—which produce much evil, and only evil, to the profession." Has there been a convention since in which this ever-fruitful subject has not occupied some part of its time, and are we any nearer to a solution of the question, What shall we do about them? Certainly they have not been abandoned by a public who see how eagerly invitations of almost any kind are accepted, not alone by what are sometimes termed Philistines—but by men of repute in the profession and of prominent standing in the Institute.

My old teacher—Arthur Gilman—one of the most accomplished scholars in the profession, a consummate wit and story-teller, one who, like Dick Swiveller, had shut up the streets of Boston against his presence therein and who had not for long been a sojourner in the fresh fields of New York, gave an admirable address at the close of the first annual convention on the relation of the architect to the public, in which he quoted this notable sentence from Sir Charles Barry in reference to his services as architect of the Houses of Parliament:—"The world can never know, and nobody but a professional architect perhaps would ever believe, the amount of annoyance, of supercilious interference, of downright brutality that I * * have been subject to. * * Forty times I have been on the point of throwing it up altogether, and had it not been for Lady Barry and my son, who have had little else to do but to quiet me down at home, I should long ago have done so."

Mr. Gilman adds:—"How shall we play to those who will not hear? How pipe to those who neither care nor know how to dance to our gentle tunes?" He looked to the Institute as a means to remedy the evil. Has it not done much to bring about a better appreciation of architecture and of those who practise it?

Charming papers are fresh in the minds of some of us older men on old Colonial architecture by Mr. Upjohn, Mr. J. Cleveland Cady, Robert S. Peabody and others, recalling buildings in their respective localities, many of which have since been destroyed. I am sure you will appreciate Mr. Peabody's quiet humor in this extract from what he said thirty years ago:—"It is because we, too, want to live amidst wainscoting, nestle in elliptical arched nooks, warm ourselves beneath high mantels at blazing wood-fires and go up to bed over boxed stairs with ramped rails and twisted balusters and see our old chairs and pictures thus appropriately environed. It is because we like and want all this that we seek for an excuse to do it all again. But isn't our liking reason enough?"

A. J. Bloor was a voluminous writer on all matters relating to the profession. In 1876, at Philadelphia, he improved the centennial period by a long and interesting paper reviewing the work

[1] Address of J. H. Latrobe before A. I. A., Washington, D. C., 881

[2] See "*Proceedings*" Consolidation Convention, 1889.

of the country. At other times he advocated in the newspapers and in addresses and in communications to national, state, and city authorities, matters of interest to the profession and wrote in the furtherance of the elevation of public taste and appreciation of architecture, not alone as a fine art but as good and safe building. He was ever ready to stand up for the highest standards of professional ethics and proper recognition and compensation for architects, and in his twenty-five years of active work in one capacity or another, he rendered valuable service and was a large factor in placing the Institute in an exalted position.

Papers were read by Edward C. Cabot, for so many years the recognized head of the profession in Boston, the President of its Chapter from its beginning until he could no longer serve and was then its Honorary President to the day of his death;—the true gentleman, the fine scholar, the generous helper of those younger than himself. After giving up practice, he continued his favorite pastime of painting in water-colors, although his physical infirmities made it necessary for him to be driven about in an open wagon—his portable studio—in which he did most creditable work.

In those early days we used to hear from our talented and graceful Secretary for Foreign Correspondence, Henry A. Simms.

W. W. Boyington, of Chicago, told us of his early experience and the opportunities or want of opportunities with which he had to contend.

Adolph Cluss read papers on chimneys, architecture, and architects at the Capital of the United States, and on other subjects.

Prof. William R. Ware let us into the workings of his mind over the great schemes for education which he was evolving and which had such ample fruition at Boston and New York.

The most scholarly man perhaps in the profession, Henry Van Brunt, drew from his rich stores subjects for our edification.

C. C. Haight talked to us on church architecture.

Glenn Brown enlightened us on plumbing and bacteria, and so I might go on and extend the list of those to whom we listened, and by not so doing some of you will doubtless say, what I myself know to be true, that I have omitted to mention some of the most important papers and subjects and persons to which and of whom, as even a partial historian, I should have called your attention, but time forbids.

In finishing I will quote from Mr. Upjohn his words of exhortation and prophecy spoken nearly forty years ago:—"Let me close * * with urgent solicitation to you, each and all, individually and collectively, to work—work—work, honestly and sincerely, with pure intentions and aims, with brotherly love to our fellow-artists * * that we may gaze into the future with hopes of more extensive and higher occupation, while our retrospect will be that of having * * aided the community to the well-assured prospects of coming days greatly enlightened in all that pertains to art, and which consequently will possess far nobler impressions of the intelligence and value of the authors of such works as will be done by those who, in the natural course of events, must follow us."

FOREST RESTORATION.

THE following communication addressed to the *New York Tribune* is so comprehensive and informing that it should be read with attention:

In the editorial in *The Tribune* on Saturday, December 22, 1906, entitled "Killing the Goose," you say:

"Stories of the reckless destruction of American forests are, unfortunately, so common as to excite comparatively little notice."

It is a great misfortune that we cannot deny the truthfulness of such a statement. It is all too true. As a people we are apparently unconcerned in nearly all matters pertaining to the preservation of our forests; and, as a resultant effect of such unconcern, there is little done to perpetuate a supply of forest products or a maintenance of an equable flow of springs and streams.

All this is deplorable and should be changed if possible. Our apathy should give way to activity. But no change need be expected until those, who should, come to a comprehension and appreciation of what is going on in the line of forest destruction and shall also consider the disastrous results which must follow our indifference.

It should be understood thoroughly by all that we are consuming our forests very much faster than their natural increment can supply, no matter how well or systematically they may be treated. The whole law and gospel of forestry in this country can be summed up in a few words. It consists in proper treatment and care of existing forests and an extensive planting of new ones, and the latter is by far the most important. This may be rejected now by forest builders, but ere long "it will become the head of the corner."

Protection and care of our present forests can do much, but not all, and the very fact that they alone will be unable to furnish a supply of lumber for the future should prompt to quick action to preserve and protect them as far as possible; but, come what may in that line, a timber famine is inevitable—is, in fact, being felt now.

As will be shown, the consumption of forest products is enormous, and that consumption is certain to increase as population increases. Modern lumbering practices are quite unlike what they were a score or more years ago. Now the sawlog man takes all he can find that will answer his purpose, or, to accept the woodman's version, "he takes everything that will make two slabs"—a veritable truth, as it is not uncommon to see a pine log —or pole, rather—on the skidway not over four and one-half inches in diameter at the top. Such is simply split by the saw and turned over to the lath department. After the sawlog man come the tie man, the pulpwood man and the acid factory man, and then fire finishes the work of destruction.

We have no law to stop this, and it may be a debatable question whether it should be prevented in all cases. The man's mill is there, his roads are made, there is a demand for the entire product of his woods, and his interests may clearly dictate the course he is pursuing. Besides, should he plant valuable species of trees after this clean cutting such a course might not be objectionable. But we cannot compel him to do that, as is done in most European countries where systematic forestry is practised.

Beyond all this, the country must have the products of the forest. We "cannot eat our cake and keep it." The amount consumed is enormous, an amount far beyond any conception in the public mind, as recently obtained statistics must show.

During the early part of 1906 the Forest Service of the United States co-operated with the National Lumber Manufacturers' Association and got returns of the lumber cut by 11,666 firms in 1905. These returns have been tabulated and can be found in Forest Service Circular No. 52, under date of December 21, 1906. The circular is entitled "The Lumber Cut of the United States in 1905." It was prepared by R. S. Kellogg, forest assistant, and is the most complete exhibit of the amount and kind of lumber consumed which has ever been published.

The circular relates that the amount of sawed lumber, as returned, comprises 90 per cent. of the actual output of the mills. Small establishments were not called on, and some that were did not respond. The amount returned was 30,502,961,000 board feet. If this represents but 90 per cent. then the total should be 38,892,178,000 feet. This does not include lath, barrel staves and headings, shingles, ties, or anything that did not come from the sawmill.

This is not all. The Forest Service also recently has issued Circulars Nos. 43, 44, 49 and 50, which give the amount of wood consumed in 1905 for railroad ties, wood pulp, used in the mines and distillation. There were purchased for the steam and trolley roads 91,500,000 ties. Putting these into board feet at 30 feet to the tie, we have 2,745,000,000 feet. For wood pulp—chemical and mechanical—there were consumed 3,192,223 cords.

A cord of pulp wood averages 550 feet, but suppose we put it at 500. Then there will be 1,596,111,000 board feet devoted to that industry. The timber, sawed and round, used in mining represents 2,422,374,000 board feet. But as 435,944,000 feet of this was sawed and is embodied in the returns from the mills, this amount will be omitted, leaving, however, 1,986,430,000 feet consumed there. Then there were 676,739 cords of wood used for distillation. Calling a cord of this equal to 400 board feet we have 270,695,000 feet more.

Adding these amounts to the output of the mills we have the astounding sum of 40,490,414,000 feet, board measure, or close on to 500 feet per capita, to say nothing of the wood used for piles and foundations, telegraph, telephone, trolley line and electric light poles, manufacture of excelsior and the like, wood used on farms and for fuel—two-thirds of our population use wood for that purpose. There is no doubt that if the amount used for all purposes could be ascertained it would reach close on to 45,000,000,000 feet.

With such an enormous annual drain upon our forests what can we expect of the future supply, unless we at once take up the burden of restoring it by planting trees on lands which have been cut over and where practically all valuable species have been destroyed? There is only one remedy. We must not expect some-

thing from nothing, "for of thorns men do not gather figs, nor of a bramble bush gather they grapes." As before stated, tree planting is the most important feature of the gospel of forestry. Discussions on selective cutting and methods of natural reproduction and the like are all good, so far as they go; but we all know the recipe for cooking a hare: First get him.

There is one important feature of Forest Service Circular No. 52 which must not be overlooked. It gives the several species of trees from which the vast amount of lumber was cut. Of the 30,502,961,000 feet there is shown to be 13,878,749,000 feet of the several varieties of pine, lacking only 1,372,731,000 feet of one-half. Other soft woods, such as spruce, fir, cedar, hemlock, cypress and a few others, made 11,035,869,000 feet, leaving only 5,588,343,000 feet for the hard woods, and white oak produced 1,210,216,000 feet of that.

Does any one assert that the pines, spruces, firs, and other soft woods—conifers—now standing in our remaining virgin forests or on the cut-over lands of the country bear any acceptable ratio to the demands of the market as shown by the returns? If not, how are these species to be reared except by planting young trees? With seed trees gone, how is natural reproduction to come about? The fact is that much of our cut-over land has no valuable species growing on it, or if any shall be found they are so scattered that natural reseeding would require centuries to bring about anything worthy of note.

Examination will show that such growth as may be found there consists mainly of bird cherry, scrub oak, aspen, yellow birch, soft maple, ironwood—hornbeam—sumac, shrubs, briars and weeds. At a distance the casual observer could well take such, when in full leaf, for a vigorous young forest, when, in fact, all that such growth can ever accomplish is protection to the soil and helping to equalize the run-off of rains and melting snows. As a forest to produce timber for market such stuff is of no value whatever.

But most astounding of all indifference to our future supply of timber and the future welfare of our country is the failure of Congress in not promptly securing and providing for the Appalachian and White Mountain reservations. To let the last great body of our virgin forests east of the Mississippi lapse into a barren waste where reforestation cannot take place in centuries, if ever, is beyond all question such a lack of the first elements of patriotism and statesmanship as will make the civilized world wonder in the future. To fail to secure these now will be the monumental blunder of the times.

S. D. Elliott.

Reynoldsville, Penn., Dec. 31. 1906.

COMMUNICATION

MUSIC IN THE DRAUGHTING-ROOM.

January 7, 1907.

To the Editors of The American Architect:

Dear Sirs:—In the experience of many years, and in many offices, the peculiar fact that almost invariably either singing, humming or whistling goes on has often struck me. If a person unused to it could suddenly find himself in a draughting-room without its occupants knowing of his presence, and after remaining a short time while the work went on in its accustomed channels, go quietly away, I have no doubt that the most marked impression his experience would have made upon him would be the fact that this music was going on. By the man accustomed to the draughting-room, this is scarcely noticed at all, nor is he usually conscious of the fact that he is joining in the quiet concert. In many cases if the "Boss" comes into the room this music will cease, if he is not usually much in the draughting-room; but if he happens to be an architect who spends much time over the boards, this will not be the case and he will very shortly be one of the musicians himself. I have found from experience that this does not hinder the work, but, on the contrary, helps it along. If I had to select a force of men which I wanted to keep with me, upon which I could depend for the regularity and quality of its work, I would undoubtedly take it from a "singing draughting-room." I do not pretend to set myself up as an expert on the psychologic relation between a good ear for music and a draughtsman's work, but that such a relation does exist I am convinced; most draughtsmen have a good ear for music. There are, of course, exceptions to this, as to all, rules, and one in particular I remember which gave me not a little anxiety. I had a draughtsman who was very capable in his line of work, of which I had a good deal at the time, and whose services were therefore very valuable to me. He had one fault, however, which nearly drove me into a nervous prostration. He could carry an air with the best, either in humming or whistling, but when he changed from one of these modes of expression to the other he invariably changed the key, and went blithely on in the new key without any knowledge of the change. If I happened to be humming with him, when this happened it would nearly take me off my stool. Two other men in the office handed in their resignations in consequence of this man's peculiarity, and finally I had to get rid of him, much to my regret, so far as the work was concerned, but much to my satisfaction in other respects. I have given a great deal of study to this subject and to the different kinds of music most affected by different grades of draughtsmen, as well as the character of the music employed over different kinds of work. I find that certain kinds of work are invariably accompanied by certain kinds of music, and that this music is almost always in inverse ratio to the difficulty of the work in hand. For example: if you happen into an office where the music going on is some complicated Wagnerian overture, you may be sure—without looking at the boards—that the prevailing work of the office is upon unimportant frame cottages; if your ears are met by a popular strain from "Hoity Toity," you can infer that the work is the intricate framework for a skyscraper. I have found the most useful music for a general practice to be Gilbert and Sullivan's operas; the range here is wide enough for almost any kind of work. I spent over a year at one time on Gilbert-and-Sullivan music in a general office practice very satisfactorily, turning out work which varied from a Masonic Temple to a Roman Catholic church, without friction. The "Boss" in this particular office was a musician as well as an architect; he had played the organ in a Catholic church for a good many years and had acquired a taste for sacred music, which made him balk a little at first, and interfered with his work, but he fell in with the procession and was soon able to "Sail the Deep Blue Sea" so gaily that the boys named him "Sweet Little Buttercup," behind his back. I recall one case in the same office where a very excellent draughtsman, if he happened to be a little hoarse, so that singing was uncomfortable, would drop his work and go home, although otherwise perfectly able to continue. This happened so often in bad weather, and his appearance at such times was so melancholy, that the "Boss," thinking him afflicted with stomach trouble, bought him a bottle of Hostetter's Stomach Bitters. This had no remedial effect on the draughtsman, but was the undoing of the office-boy, who took half the bottle at a dose and acquired a jag which lasted him for a week. I make it an invariable rule now to keep my office supplied with some good throat remedy and find that the work goes on much more satisfactorily in consequence. The relation between the capabilities of a draughtsman and his ear for music—not necessarily his voice—is a very close one as a rule; the man with a true ear will be found accurate, neat and painstaking in his work. If a man presents himself to me for employment, I now merely ask him how long has been his experience, no other questions, and then by a few moments' use of an arrangement of tuning-forks which I have set up I test the accuracy of his ear and fix his salary according to the result of my examination. I have done this for a number of architects as well as for myself, and in some dozens of cases have not had one where the result has not been satisfactory. This method is much more sure of getting at the true value of a man than any amount of "samples of his work," for in the selection of these samples he has usually chosen the very best things he ever happened to produce and they rarely give even a fair average. The ear test gets right down to his actual capabilities and you do not have to take his word for anything. To be sure this method, to be employed successfully, presupposes a true ear on the part of the person employing it, but this is no valid objection to its use by architects, for as a matter of fact most architects, if not all, have a true ear. I refer here, of course, to architects who have chosen the profession because of a natural fitness for its practice, not at all to those who have drifted into it because of propinquity alone, although even here it would be valuable in large offices where the architect could afford to employ a competent musician to make his examinations. Another objection has been urged; that it would require long practice to acquire the necessary judgment to properly fix the salaries by this method; this objection I have been able entirely to overcome. Taking the salary rates of New York City as a standard, I have carefully tabulated them in relation to the percentages attained by the tuning-fork test.

These tables can be used anywhere, by merely filling in the proper figures in the blanks opposite the New York prices in accordance with the prevailing rates of the locality. These blanks, printed on cardboard, in convenient size for filing, together with a complete tuning-fork outfit (all set up in a neat hardwood case), will shortly be obtainable at all supply houses at reasonable figures. This will be a boon to the profession I have no doubt. In asking you to give this letter space in your columns I am not seeking free advertisement. I am giving to the profession, without hope of pecuniary reward, the results of my study. Any profits on the sale of the outfit will accrue to the houses furnishing them, and it is therefore merely to bring the subject before the profession, through altruistic motives alone, that I send this letter to you. Expecting no profit therefore, I will ask you to withold my name, as my time is valuable and I cannot afford to take it up in receiving, much less answering, the flood of letters I feel sure would pour down upon me were you to make it public. Yours very sincerely,

"A Very Occasional Correspondent."

ILLUSTRATIONS

THE WEST STREET BUILDING, NEW YORK, N. Y. MR. CASS GILBERT, ARCHITECT, NEW YORK, N. Y

SECTION AND REAR VIEW OF ORIGINAL DESIGN FOR THE SAME.

PLANS FOR THE SAME.

ENTRANCE DETAILS OF THE SAME.

CORRIDORS OF THE SAME.

DETAILS OF ELEVATOR SCREENS IN THE SAME: THREE PLATES.

Additional Illustrations in the International Edition.

THE CATHEDRAL, MONZA, ITALY.

HAMPTON FERRY, EVERSHAM, ENGLAND.

CHURCH AT PINTERVILLE, NEAR LOUVIERS, EURE, FRANCE.

HOUSE OF LA REINE BERENGÈRE, LE MANS, SARTHE, FRANCE.

NOTES AND CLIPPINGS

The Corrosion of Steel in Cinder Concrete.—Although valuable as a fire-resisting material, the great disadvantages of cinder concrete in construction are its low tensile and compressive strength, and the corrosion of steel embedded in the material. In connection with the latter point we may usefully refer to the report made by a special committee of the Structural Association of San Francisco, by whom reinforced cinder-concrete floor-slabs have recently been examined in three buildings. Stated briefly, the conclusions drawn were that the metal was corroded to such an extent as to endanger seriously the safety of the floors, and that it was not probable the floors would have continued to support their loads longer than from one to three years. In striking contrast with the state of things in these cinder concrete floors was the condition of the floors in another building inspected, where the aggregate consisted of broken rock and the reinforcing bars, where exposed by the committee, were as sound as when first applied. Various reasons have been brought forward to account for the corrosion of metal in cinder concrete, and various remedies of more or less practical character have been suggested. In our opinion the most efficacious remedy is to avoid the use of cinders as a constituent of reinforced-concrete.—*The Builder.*

Grandmotherly Legislation.—In a paper read recently before the Architectural Association, Mr. William Woodard said in part:

"I am not aware, in looking back forty years, that London was a very much worse plaec then under the Metropolitan Board of Works and under the old vestries than it is now under the swelled body at Spring-gardens and under the equally swelled bodies called borough councils. Regard for open spaces was secured by the then Lord Brabazon (now the Earl of Meath), the Chairman of the Metropolitan Gardens Association; and although the London County Council takes credit for maintenance as open spaces what would otherwise have been built upon, much of that for which they take credit is due to the Association I have referred to; in fact, I was myself, as honorary architect to that Association, the principal mover in preventing the London County Council building upon the triangular plot at the junction of Oxford Street and Bloomsbury Street, and equally in preventing the erection of a block of buildings, projected by the London County Council, right in the centre of Piccadilly-Circus.

"In all these matters I can, as I have said, see a growing consumption of red tape and officialism; in fact, ink and paper, instead of the sound practical knowledge which existed thirty or forty years ago, and which I hope soon to see again revived. But this end will not be attained unless active opposition is made to the unnecessary interferences to which I have referred. Large building speculators are, to my knowledge, shutting up their pockets and thereby adding to the long list of unemployed in the building trade simply because they will not submit to the delays, petty interferences, and results of inadequate knowledge forced upon them by those various bodies. Surely some credit should be given to architects of repute and experience for knowing nearly as much about healthy and sound construction of a building as an assembly of green-grocers and cheese-mongers, or perhaps youthful scholars who come from technical schools, armed only with superficial knowledge without any experience in active building operations, but who are led away by the crude ideas of faddy councillors who do no good whatever to buildings in course of erection, but, on the contrary, manage to make them inconvenient inside and mutilate them outside.

"It may be that there are architects who do not object to this infantile instruction on the part of these constituted authorities, and who know that the more drawings they make to satisfy the whims of such authorities the more money they get from their clients; but I thoroughly believe that the majority of architects would prefer to get on with their building without such interferences, and without such opportunities of adding to their professional charges."

Incomplete Adoption of the Metric System.—In the discussion following the reading by Colonel Sir C. M. Watson, K.C.M.G., C.B., R.E., of a paper on the "Compulsory Introduction of the Metric System into England" before the Society of Arts, Mr. R. K. Gray said the assumption was often made that only the metric system was used in France and other countries. He was the managing director of a company employing 900 men in France and about 3,000 in England, and from personal experience he would like to state in the most positive manner that it was a great mistake for any Englishman to believe that the metric system was solely employed in France. For instance, if anyone went to the market-place he purchased things by the litre, but wine was sold by "le barrique" (225 litres); "le feuillette" (134 litres); "le demi setier" (1/4 litre), and "le chopine" (1/2 litre). People who were not accustomed to the terms of the country did not know what they meant. The old term of the barrel was still used because the barrel was the most useful size for the trade in wine. The same remarks applied even to Government departments. He remembered asking a clerk in the post-office how much a registered letter would cost, and received the reply—"Fifteen," meaning fifteen sous. The proper answer for the clerk to have given would have been 75 centimes, but he talked in sous, because it was far more convenient. In the practical application of the measures in France, the people could not detach themselves at all from the natural selection of the proper measures for certain trades. If what he said was correct, why should the people of England make compulsory measures which, in the country of their origin, were not actually in use to-day in common life, although it was 112 years ago since they were inaugurated?

Mr. Bennett H. Brough writes to supplement Mr. Gray's remarks on the persistency of the old units in France, by directing attention to the official circular recently issued by the French Minister of Commerce, a translation of which appeared in the current issue of the *Engineering Magazine* (p. 268). It showed that the penalties imposed by the Act of 1837 had not proved sufficient to prevent the use of the old units, and contained a pathetic appeal that metric units should be used. In Great Britain, where the use of the metric system was permitted by Act of Parliament, it seemed unsportsmanlike that the metric advocates should desire to have all who did not accept their views fined or imprisoned. Every gaspipe would have to be torn out of our houses; all existing technical literature would be rendered useless; every retail trader would have to buy a new set of weights, and the workingman would be fined or imprisoned if he asked for the half-pint to which he was accustomed. The writer had had experience in mine surveying work in Germany, and even there old units persisted. Shafts were measured in Lachters of 6 feet; horizontal lengths were measured with centimetres on one side and, for actual use, Hanoverian feet on the other, and the compass used was graduated into 24 hours, eighths, and sixteenths of eighths, so essential for rapid work was the principle of continual bisection, which was the basis of practical geometry and of mechanical engineering practice.

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AS Mr. Carrère well says, in a letter that may be found in another column: "Personal opinions [about competitions] necessarily vary so greatly and change with each problem or condition that there is little or no benefit to be derived from an academic discussion of the matter." It is this very shifting and changing of the position of sensible and well-intending architects, under the temporary influence of self-interest, that we have found so irritating, so illogically contradictory. At the same time we have been even more irritated at finding that we ourselves are not absolutely consistent, but unconsciously yield to the temptation to "change with each problem or condition." As a help to ourselves in the attempt to be consistent and with the feeling that it may be of some help to others, or at least afford them a passing amusement, we have thought it worth while to formulate briefly and set down as a profession of belief the views which, at this moment, we are inclined to believe in and uphold. These articles of faith may be found in another column, and they will at least serve as texts for any one who cares to discuss them.

THOSE who read in our last week's issue the account of the convention at Washington noticed that the report of the Committee on Competitions, though presented and discussed, was neither accepted nor printed. The delegates felt that the recommendations made in it were altogether too extreme, and if, by chance, this feeling was due to anything we have said of late on the subject of competitions, we are very glad that we spoke in time. It will have been noted, too, that the members of the committee seemed to be rather adrift as to how to proceed in gathering, collating and digesting the majority views which the convention obviously wished to have reported rather than the more personal opinions of the actual members of the committee itself, and they seemed to think it would be necessary to operate under a very laborious and costly process of editing, printing, and distributing to all members such discussion of the matter as members might be induced to provide, and then to repeat these steps over and over again, as the discussion advanced by stages. We venture to think that a far better, fairer, and more useful way would be to conduct this discussion in the columns of the architectural press—our own columns are wide open to such matter—up to a fixed date, which would leave the reporters time enough before the next convention to properly digest the matter and arrange it for presentation and consideration. There is this obvious reason for a general public discussion: the members of the American Institute of Architects are not the only architects in this country who have an interest in the regulation of competitions, nor are they the only ones who possess wise and logical minds, and it is not desirable that a final pronouncement should be made, even by so large a body as the Institute, until after adequate steps have been taken to ascertain the views of the profession at large. As it is likely that more or less of our readers may act on the suggestion here made, we will ask each correspondent to close his communication with a final paragraph recapitulating briefly the *new* points he feels he may have made. We can then tabulate these points and publish the tabulation from time to time, with references to the date of the fuller discussion of the point in question. In this way a cumulative digest or synopsis might gradually grow into being, which might be of much service to the reporters.

FOR our own part, confining our reflections still to the matter of public buildings, we are inclined to feel, rather strongly, that, perhaps, the greatest of the "competition evils" is not that there are so many open competitions, but that there are so few. Because there now are few open competitions, it happens that, when one is announced, there is a rush of competitors from everywhere, a vast production of unusable and costly drawings, a great waste; and this inevitable waste gives to the opponents of the theory of competition one of their strongest arguments. But if in place of one interesting competition being announced every two or three months, as now, a couple of dozen of them were announced every week, it follows, obviously, that fewer architects would compete in each given case, and the wastage in effort would be proportionately less. It might be argued that the wastage would merely be distributed over a large number of competitions in place of being concentrated on

a few, might, in fact, be actually largely increased. This, however, would not really be the case. Under existing conditions the hopelessly incompetent performers, whose offerings now simply "clutter up" the competitions that are held, are encouraged to keep on competing, through finding that they enjoy the fellowship of many able men whose offerings have been equally unsuccessful with theirs. The rejection of their own work, therefore, carries with it no convincing proof of its intrinsic worthlessness. But if these same men find themselves turned down again and again in smaller affairs, they will be likely to appreciate the true situation and retire permanently to those forms of private practice that their skill and training enable them to cultivate with honor and profit. Moreover, with more frequent competitions, the number of competent competitors will be smaller in each case, since having already recently won several of these affairs a given architect will be already as fully occupied as he can be, and so will not be tempted to take part in an indefinite number of other affairs. We incline to think that a statute law compelling the procurement of designs for public buildings through the medium of a compound competition would eradicate, for this generation, a great part of the competition evil.

IN spite of, or perhaps because of, the strenuosity and zeal manifested by Attorney General Carson in inquiring into the Pennsylvania Capitol scandal, he sent in to the Legislature, on the eve of his retirement from office, a report which gives every one connected with the undertaking an absolutely clean bill of health! A good many people will consider it merely a "whitewashing" report, of the standard Pennsylvania type, and just such a one as was to have been anticipated at the very outset. At any rate, the Attorney General treats Mr. Sanderson, the "furnishing" contractor, very handsomely, seeing that the latter admitted that the working of the "per foot" and "per pound" rules had put into his pockets in the way of net profits over a million dollars more than his original figuring had led him to anticipate. As to the "per pound" and "per foot" rules, the architect, finding testimony in their support rather hard to get at, now rests his case largely on a contract made at a pound rate by the French Government in 1863. In spite of the late Attorney General's opinion, the matter is still likely to come before a court, where witnesses can be cross-examined under oath, for the State Treasurer is still resolute in his determination not to cash the warrant for fifty thousand dollars issued to the architect, on commission account, by the Auditor-General. Moreover, Mr. Stuart, the new Govenor, has in his inaugural address promised that thorough investigation of the whole matter shall be made.

IN the matter of the architect who, as we explained a week or two ago, found himself obliged to replevin certain drawings and negatives from a draughtsman recently employed by him, we have received from the draughtsman concerned certain information which, in spite of the rather rambling manner in which it is compiled, we think we at length comprehend. As we now understand it, the case belongs in a slightly different category from that to which we assigned it. It appears that the draughtsman was not the *ingénu* we had surmised, but a designer employed recently on competition drawings, and as one of his designs was successful he naturally wished to preserve a record, and so, with his employer's knowledge and consent, as he believed, made negatives and prints of the drawings in question, and, with, as he supposed, the latter's full knowledge and approbation, had had them in his own keeping for several months before the rupture with his employer came about. It is these negatives and prints that under threat of suit have been surrendered. That a draughtsman has no right to go off with a copy of his employer's drawings, whether sketched, traced or photographed, except with that employer's explicit permission, cannot be questioned. Nor, on the other hand, can there be doubt, we think, that, if the facts are as here stated, Mr. Stevens now holds possession, in the shape of negatives and prints, of property that does not belong to him, since the draughtsman used his own money and private time in their making. If the case had ever come before a court, the judge would probably have settled it by ordering the negatives and prints to be destroyed in the presence of a court officer.

ALTHOUGH the Boston Museum of Fine Arts has recently elected a new President in the person of Mr. Gardiner M. Lane, a banker by profession, but a man much interested in and possessed of much knowledge of the arts and for a year one of the Museum's trustees, the even more important post of Director still lacks a permanent incumbent. Mr. J. Randolph Coolidge, Jr., the architect and member of the Board of Trustees who has been willing to discharge the duties of the office ever since Mr. Edward Robinson resigned, now finds he no longer has the time to devote to them, and Mr. Benjamin Ives Gilman, the Secretary of the Museum for several years, has been appointed Director, *pro tem.* Many people hoped that Mr. Coolidge could be induced to accept office on a permanent basis, as his qualifications fitted him admirably for the post; but, when an architect is truly interested in his own art, it is very difficult to wean him from it, and we cannot feel surprised at his decision.

THE competition for a new layout for the city of Guayaquil, Ecuador, carried out under the auspices of the Société des Architectes diplomés par le Gouvernment, to which we referred some months ago, has been decided, and all four prizes have been carried off by Frenchmen, although the competition was open to all. The most curious thing about the affair is that the competition seems to have been decided in Paris by a jury no one of whom, probably, had ever visited the city which it was sought to develop and beautify. When it is remembered how unbecomingly M. Bénard's beautiful drawings adapted themselves to the actual site of the Phœbe Hearst architectural plan for California University, it is allowable to question whether the Ecuadorian city will ever derive much benefit from the skill expended in this recent competition.

THE GOLD MEDAL FOR DISTINGUISHED ACHIEVEMENT.

AT the ceremonial session of the American Institute of Architects, held in the Corcoran Art Gallery at Washington, on January 8, the Institute's President, Mr. Frank Miles Day, addressed the guest of honor as follows:

SIR ASTON WEBB, Members of the American Institute of Architects, Ladies and Gentlemen:

The American Institute of Architects establishes upon this, the fiftieth anniversary of its foundation, a medal, the intention of which is to mark distinguished achievement in architecture wherever found. To you, Sir Aston Webb, it will be our privilege to-night to give this medal, and we are gathered here to signalize, not merely by that token, but by our presence, the admiration that we feel for your works and the respect that we entertain for your career.

That this medal should first be given to an Englishman needs little explanation. A reasonable modesty might well constrain us to look beyond our own borders, and it is but natural that our thoughts should center on that land with which, more than with any other, we are united by ties of race and thought. We cannot escape from our indebtedness to that land, for of how large an import are the institutions that came to us from it! The principles of our liberty, civil and religious; the foundation of our laws; our speech itself; all these and countless other gifts reach us from forefathers who were both yours and ours. But all this, full of meaning as it is, would be little pertinent to-night were it not that, among those gifts, our early settlers brought the wholesome tradition of your native art of building; and as each wave of immigration reached our shores from yours, it brought with it a larger knowledge of that art and a stronger impulse to build wisely and well. How fully we learned our lesson you would see, Sir, could you but visit such widely separated places as Newport, Annapolis and Charleston, or could you follow the windings of the River James. You would find "Westover," "Homewood"' or a dozen other mansions as convincing in their quiet dignity as "Raynham Hall" or "Groombridge Place"; and churches, town-halls, state-houses expressing in the same admirable fashion the aspirations and the limitations of life in those early days.

And just as we then received from you the traditions of Inigo Jones and Sir Christopher Wren, traditions that gave vitality and character to our Colonial buildings, so at a later time the Classical revival that swept over Europe reached us directly from its English source, William Thornton, who designed "The Octagon," he who stamped a definite and noble character upon the Nation's Capitol, Thornton, no less than his patron Thomas Jefferson, gained his knowledge of Classic architecture from those studies of it in which your countrymen were pioneers.

But if in those days we saw our Classic art through British eyes, I fear that to-day, with ready access to the architecture of the world and with a leaven of men among us trained in foreign schools, we might forget an indebtedness of centuries, were it not that we are irresistibly drawn to your island by the splendid fabrics that adorn it, from Cornwall to Caithness. For, Sir, all that is best in your art is ours, if we have but the skill to make it so. Majestic Durham, high above the River Wear; the tree-embowered Haddon, with its terraces and stately gardens; the very Abbey by the Thames itself—innumerable treasures of a thousand years, all these are ours, if we but read them right.

But we have not failed to recognize that, glorious as is the past of your art in England, its present is full of vigor and charm. For many years this Institution has elected to honorary membership Englishmen, the mere mention of whose names calls up the vision of many a noble edifice and many a service to the cause of art. To name only the dead, Sir Charles Barry, Scott, Penrose, Street, Cockerell, Burges, Ruskin. But among the living, how many are there whose names are dear to us, with whom you have the privilege of an intimate friendship—Ernest George, Phené Spiers, John Belcher, the venerable Norman Shaw, whose laurels are yet green, Bodley, whose perennial youth justifies him in Washington commencing even a cathedral.

It is from among men such as these that we have chosen you, Sir, a younger but no less distinguished man, to confer upon you an honor which we shall perhaps not frequently award; and therefore, and because an ancient custom sanctions it, I am to recount in good set terms the reasons that have moved us to choose you as our medalist.

Matthew Arnold's dictum, that not only is *good* work needed to put a poet in a secure place, but a *great body* of good work, is no less true of other arts than it is of poetry. On the score of amplitude, your achievement lacks nothing, for no architect in England, save Sir Christopher himself, has been entrusted with the conduct of so many and such vast works. Whether they be houses, churches, courts-of-law, schools, museums, colleges, government offices or universities, I can name not a tithe of them. Yet, perforce, I must speak of some of them, and of these I name first the Victoria Courts, in Birmingham, the model of many similar buildings, and next the new buildings for Christ's Hospital, one of the largest groups of school buildings in the world, yet clearly conceived and treated with a charm that cannot fail to leave an imperishable imprint on the lives of its students. But these were years ago. Just now, in the metropolis itself, you bring to completion the great buildings of the Royal College of Science, no less admirable for the way in which they solve a difficult technical problem than for that in which, without losing their individuality, they have been brought into harmony with a structure utterly different in purpose and conception, their opposite neighbor, the Imperial Institute.

Did time serve, I should wish to say more than a word upon those vast additions to the Victoria and Albert Museum, South Kensington, upon which you have been engaged these fifteen years, and in which we may hope shortly to see installed the noble collections which they are intended to shelter and to dignify.

Through your hands also the British nation is giving to the world an example of municipal improvement upon a vast scale and under circumstances the most fortunate. I mean the treatment of the grounds about the National Monument to Queen Victoria, in front of Buckingham Palace, and the planning of the Mall and the "Processional Way" leading from the monument to Charing Cross. Although progress with an undertaking of this size is necessarily slow, yet perhaps you will have it finished before we, in our capital city, have brought back to its original simplicity the much-perverted plan of l'Enfant and of Washington.

Not the less interesting, because it deals, in a prosaic age, with the world's most splendid spectacle, is the arrangement upon which you are now at work for the site of the "durbars" at Delhi.

Of these and many others of your works all may to-morrow gain an idea from the collection of illustrations of them which are hung in the Institute's house, The Octagon.

But in the midst of these large affairs you have not neglected to perform a labor of love in the restoration of ancient edifices; as at the fine old Norman church of St. Bartholomew the Great, the oldest church in London, which for well nigh thirty years has been within your charge, and which you have rescued from neglect and ruin and wisely rehabilitated.

Nor have you ever failed to discharge those burdensome duties which every leader owes to the rank and file of his profession. On how many committees, in how many offices you have advanced their interests, it boots not to say. From among these let me note only the Presidency of the Royal Institute of British Architects, that institute that we are proud to regard as the model and prototype of our own; and the Chairmanship of the Board of Architectural Education that is so successfully unifying and improving the training of architects in the United Kingdom.

That your talents have not been unrecognized by your countrymen is shown by the volume of your works, by the honor of Knighthood conferred upon you by the King, and most of all by your election as a Royal Academician.

Thoreau exclaims "How admirably the artist is made to accomplish his self-culture by devotion to his art," and in you we see that it is not only nature but devotion to your art that has endowed you with "the intellectual versatility and refinement, the felicity of temperament" which we recognize alike in you and in the work that you have done.

And now, Sir, because you have these qualities, and because, for a life-time, you have dedicated them with signal success to the service of your profession, the American Institute of Architects confers upon you its "medal for distinguished achievement."

SIR ASTON WEBB'S RESPONSE.

MR. PRESIDENT, Mr. Howard, ladies and gentlemen, and members of the American Institute of Architects.

I am afraid that no words of mine can possibly express the high appreciation that I feel that this Institute should have seen fit to bestow this gold medal of yours upon the architects of England through so humble a representative of that great profession as myself. Sir, any little modesty that I may have had, I am

afraid must have entirely vanished as I sat hearing your far too kind remarks upon myself and what I have done. I thank you sincerely, and I must ask the audience to take off some of it.

I have come over here personally to say "Thank you," in the sincerest and the directest and the simplest way I can. And to assure you that all architects on the other side of the water will deeply appreciate the fact that on this, the jubilee day of your Institute, and the institution of this gold medal, you should send it over to the other side. Nothing, I am quite sure, in speaking for my brother architects, would they appreciate more than that, and I venture to think that it must do a great deal to strengthen the good feeling and friendship which I am glad to think already exists between the architects of both countries. Strengthened it already has been by the delightful personal intercourse that many of us had the opportunity of having during the International Congress which took place in London last summer.

As some slight indication of that good feeling, I have received this morning—before it was light—a cable from London from the Secretary of the Royal Institute of British Architects, asking me to make an announcement of the fact that at their meeting which they held last night, they elected, subject to their acceptance of the election, three new Honorary Corresponding Members of our body. Those three members, I hope you may be interested to hear they have elected, are your President, Mr. Frank Miles Day; your Vice-president, Mr. Cass Gilbert, and your past President and almost father I believe of the Institute, Mr. George B. Post. We shall be very proud if these three gentlemen accept that election and become one of us. As Honorary member of the body we have already the honor of having Mr. McKim as one.

It adds greatly to my pleasure to receive the medal from an architect so eminent as yourself, one whom, if I may so say, has done such refined and distinguished work, much of which I have had the pleasure, the last few days, of seeing and admiring.

It has always been one of my happiest recollections that it fell to my lot to have the privilege to hand our medal to Mr. McKim. He came over personally to receive it, and I need hardly tell you that directly he arrived he entered into our hearts and affections and has remained there ever since.

There is very much to an Englishman, landing here for the first time, that is very familiar to him. One does not feel at all in a strange land. He meets also, of course, a great deal that is not so familiar—that is another of the charms of coming over here. And as I walked about the streets of Philadelphia and New York, I have had constantly running in my mind the words of Jean Ingelow, who was herself the sister of a well-known architect and a great friend of mine, when she said:

It is not likeness only charms the sense
It is not difference only sets the mind aglow;
It is the likeness in the difference
Familiar language spoken in the snow.

As one who has spent only a few days in your country, I am sure you will not expect me, and I feel it would be the greatest presumption on my part, to express any opinion on the splendid architectural achievements I have seen in Washington, Philadelphia, and New York. But I have noticed how great a hold architecture seems to have on the heart and imagination of the people here, not of architects only, but of the people generally, and I was very much prepared for that by a remark that Mr. Post made when he was speaking at the Guildhall, in London, when he said that, fifty years ago in America, architects and their work were not very much considered, but at the present day the position of both the practitioner and the art had been greatly, very greatly improved. That seems to be one of the most hopeful signs for architecture in any country, that the people take a real and living interest in it. It does not seem to me to be at all wonderful, when one looks about and sees the wonderful problems that architects here have to solve.

Take New York, for instance: there appears to be a terrific problem being solved there at a terrific speed which takes a poor English architect's breath away. To see the lower part of New York being practically rebuilt with new buildings, some five or seven times taller than the buildings that stood on the site before. At present the work is only half accomplished, and it is difficult to judge of the ultimate effects. For the moment, we see mainly the unfinished side of these huge structures, and there is naturally a sort of gappiness and want of scale in the whole city which will disappear when the streets are filled with these buildings. And, for myself, it seems to me—as far as a tourist is able to judge, that the proportion of these streets will finally assimilate on a gigantic scale very much to the streets of some Italian town, such as Genoa, or Florence. These streets *will* have the great overhanging cornices apparently almost meeting across the road, and it does not surprise me to find that these streets have already attracted the pencil of artists, such as Mr. Pennell and Mr. Cooper, and I imagine before long they will attract the pen of the poet. The busy traffic of the streets and the idea of the quiet thinker in the top story, really seems to me a suggestive and a very impressive thing. I am quite serious. I felt this very much the other day, when I was taken out of a very crowded and unusually busy street and shot up into the air—I don't know how many stories—and found myself in the calm and artistic surroundings of Mr. Cass Gilbert's rooms, in a pure and tranquil air, and forgot all about the noise and bustle below. Just as I was leaving, some papers published illustrations of buildings twice the height of the highest sky-scraper that is in New York! When these are up, I imagine the present monsters will be reduced to pigmies and all the scale retired again, and what will happen then, I am glad to say, it is not for me to forecast.

The problem of the proper control of the expansion going on in our large cities seems the same in both countries. The abnormal growth in many of our large cities is the same as in your own. We feel—I don't know if you feel it so—that this expansion ought to be controlled by certain conditions, which should include open spaces for air and recreation, and also sites for public buildings, churches, etc. The present development of many of our cities at any rate is, I am fraid, along the lines indicated by the Bishop of Birmingham, who said the other day: "We walk through miles and miles of streets in our big cities without open spaces, without anything except what Dickens called 'an uninterrupted view over the way.'"

We want the whole mass of our cities to be organized, planned and laid out, but instead of that our cities grow at the will of the jerry builder—I don't know if you have them here—orderless, shapeless, without method, because there is no one to plan and forecast, to give the city dignity, space and order, nothing to make it worthy to be called a city.

Over here, I believe, you are taking this matter seriously in hand, and your Institute is often consulted in such matters. I am glad to say that is also becoming a fact with us, that the Government and public bodies do to some extent consult us in these matters. And we are making some small progress. For instance, Regent Street and the Quadrant had to be rebuilt, owing to the leases falling through, and the design was submitted to a small committee of architects, with the final result that the design is now in the capable and artistic hands of Mr. Norman Shaw. You, of course, have an outstanding example of what may be done for architecture in the plans proposed with such extraordinary ability by the Park Commission for the improvement of this already beautiful Capital of yours. The details of this great scheme are already very familiar to us in England, and we look forward to its full completion and to seeing Washington one of the beauty-spots and wonders of the world. I hope you will agree that the proper placing of our public building is as important as the design itself. Wren, in his time, complained that our public buildings were nearly all seen sideways. That is the same now. It is quite an exception for any of our large public buildings to be really handsomely approached. You, of course, have a magnificent example of the proper placing of a building in the Capitol here, and in many other cases. We, I am sorry to say, have very few. The French, of course, are the masters of the work of arranging public buildings, and we all know how the Opera-house in Paris gains by the splendid Avenue de l'Opéra, end how the Avenue de l'Opéra is improved by the Opera-house at the end of it. With us it seems to be thought that for the purpose of traffic no street must ever be ended, going on forever, and I must confess I have seen streets on this side of the water which have the same tendency. I venture to think that among the public duties of the several Institutes of Architects, is to educate the people that, in the laying-out of cities, there are other matters to be considered than traffic and sewerage, and that the placing of buildings at the ends of vistas is one of the matters that ought to have their consideration. A vista, in my opinion, ought to be closed, and closed in good time.

In architectural matters—and I hope I am not too technical, but this is the ony opportunity I shall have of talking on matters architectural—the most important is architectural eduration. I think the Convention has had a most interesting and important report on that matter just brought before it. We ourselves are going through a sort of revolution quietly in the matter of architectural education. All our young men, hitherto, have gone to an architect's office for three or four years, and been apprenticed.

Now they go to school for two years and afterwards to an architect's office. We hope to teach systematically what can be taught systematically, and afterwards put them to work in an architect's office. We hope to substitute for the dry study of old work through dates and comparison of dates—as introduced by Rickman and others, the more important comparison of the whole structure by plans and sections, and the balance of weights and thrusts. We have started a board of architectural educaion, which your President has mentioned, with a view to co-ordinating the work of the schools. I have only touched on this because it is a matter of deep and abiding interest, whether in your country or in ours. For we must remember that the young men we are educating will follow us and we shall soon have to consider them as our equals, possibly as our superiors, and perhaps stand aside to see them pass us, and we must recognize education to be the greatest influence on our art.

By encouraging the study of motives rather than the history of architectural design, we hope to bring before the mind of the student that our art is creative rather than imitative and that though looking backward is informing and delightful, looking forward is more hopeful and stimulating still—the last century was spent by us at any rate in analysis and criticism of what had already been done, the present century may be spent in showing there are resources that will clothe the multifarious requirements of the present day in reasonableness and beauty expressive of our times.

Mr. President, ladies and gentlemen, the memory of this evening will remain with me all my life. I shall take the medal home and keep it amongst my most treasured possessions, and hand it down to my children, who, I am glad to say, are architects too, and will therefore appreciate it. And when I look at it, as I often shall, it will remind me—though no reminder will be needful—of your wonderful country, your splended architecture, and your boundless generosity and hospitality which you so lavishly bestow on my countrymen and have extended to me on this occasion.

SIR ASTON WEBB.

SIR ASTON WEBB, R.A., F.R.I.B.A., F.S.A., eldest son of the late Edward Webb, engraver and landscape painter, was born in Clapham, May 22, 1849. Married, September, 1876, Marian, younger daughter of the late David Everett, F.R.C.S., Worcester.

Educated at Brighton in private schools, he was articled at seventeen to Messrs. Banks and Barry, architects of Westminster, and remained with them for five years. He then traveled on the Continent, sketching, for a year, visiting France, Italy, Greece, Constantinople, Austria, Germany, etc. In 1873 he began practice in London and won, in the first two or three years, several smaller competitions and also the Pugin Traveling Studentship, consequenty spending two months sketching in Cambridgeshire and Suffolk.

In 1876 he won a competition for a block of almshouses at Worcester, which were erected and led to many commissions in Worcester and the neighborhood, including the restoration of several churches and the building of a new one.

In 1880 he was appointed to the Restoration of the Church of St. Bartholomew the Great, the oldest church in the City of London, a work which has progressed at intervals over a period of twenty years.

After serving in all the offices of the Architectural Association, he was elected president in 1884.

About this time, Mr. E. Ingress Bell joined him in portions of his practice and many works have been erected by them in collaboration, under the title of Aston Webb & E. Ingress Bell. They competed in the open competition for the New Admiralty and War Office Building, obtaining a place in the final competition, and were ultimately placed second. Entered the open competition for the new Law Courts at Birmingham and were placed first in the final competition by the assessor, Mr. Alfred Waterhouse, and jointly carried out the building. Subsequently they were among the seven selected to compete for the Imperial Institute, but were unsuccessful. They were again selected to compete for the new buildings for Christ's Hospital, in which they were successful, and the buildings were erected, forming one of the most complete groups of school-buildings erected in England, at a cost of about half a million pounds.

Other works erected jointly were: The Metropolitan Life Assurance Society's building in Moorgate Street, the Royal United Service Institution, adjoining Inigo Jones's Banqueting-House, Whitehall, and the new University of Birmingham, still in course of erection and covering some twenty-five acres.

In 1890 Mr. Webb was one of the six invited by the Government to compete for the completion of the South Kensington Museum, his design being selected, and, after many delays, now being carried out, at a cost of half a million pounds.

He was also commissioned by the Government to erect the new Royal College of Science at South Kensington, the extension of the Admiralty Buildings, with the arched opening from the Mall to Charing Cross, the Britannia Royal Naval College, at Dartmouth, and the Royal College of Science, Dublin, in conjunction with Mr. T. M. Deane, of Dublin. He was one of the five selected to compete for the layout of the site of the National Monument of Queen Victoria, his design being accepted and the work is in course of execution.

He is now engaged on a scheme for laying out the site of the "durbars," held at Delhi.

After serving as honorary secretary and vice-president, Mr. Webb was elected president of the Royal Institute of British Architects in 1902, and was presented with the King's Royal Gold Medal in 1905. He was elected Associate of the Royal Academy in 1899 and full Academician in 1903, and received the honor of Knighthood from H. M. the King in 1904.

He is trustee of Sir John Soane's Museum and of the Architects' Benevolent Society, treasurer of the Artists' General Benevolent Institution, auditor of the Royal Academy, chairman of the Board of Architectural Education and chairman of the Board of Studies for Architecture of London University.

A PROFESSION OF BELIEF.

AT the present moment, we are inclined to believe in and unhold, as doctrine tenable and worthy of adoption, the subjoined briefly stated opinions as to the procurement of designs for public buildings and the ethics affecting the matter:

METHODS AND DEFINITIONS.

"DIRECT APPOINTMENT:" An admirable method, one which should always be adopted—where only the interests of the appointee are to be considered.

"OPEN" COMPETITION (wide open): If employed at all, should have the simplest of requirements and the most stringent of controlling regulations.

"LIMITED" (AND PAID) COMPETITION: A good method, capable of being an excellent one, provided that the invited competitors are selected on their merits, not through the favoritism or nepotism of the appointing body.

"MIXED" COMPETITION: Consists of a limited (and paid) plus an open competition carried on synchronously and after the same programme. If properly regulated and controlled, offers possibility of achieving an even better result than a "limited" competition.

"DOUBLE" COMPETITION: Each of the preceding forms of competition may be conducted as a "double" competition, the prize-winners in the first half being required to re-compete amongst themselves in the second half. If the programme and conditions remain as at first, the gain, when compared with the cost and delay, is of doubtful value.

"COMPOUND" COMPETITION: The best, fairest and most economical form of competition yet devised; the only form that enables promoters to prove to those to whom they are accountable that they have made a sufficient and unprejudiced attempt to procure "the best result that existing conditions permit." The first competition, open to all and based on a partially stated programme, is for the selection of a certain number of architects who are to compete in the second competition with an equal number of the ablest architects accessible, the programme being fully stated and each competitor being paid. Combines the possibility of discovering unknown talent with certainty of profiting by the skill of the able architects invited to compete in the second competition.

GENERAL TENETS.

—[A.]—

INHERENTLY there is nothing wrong in the principle of competition; openly or veiled, it prevails in every walk of life and affects all business operations.

—[B.]—

THE "COMPETITION EVIL" does not lie in the principle or method of architectural competition, but in the misbehavior of those who compete.

—[C.]—

The expressions "competition evil," "indecent scramble," "pure gamble," *et id omne genus,* are but the arguments of phrasemongers, the ogres raised by too active imaginations impinging on prejudiced minds.

—[D.]—

An "academic discussion" is one in which views are expressed that differ from your own.

—[E.]—

It is simply impossible that even the ablest architect, who, eventually, finds he has been unconsciously competing in an open competition with, amongst others, some draughtsmen and office-boys, can have "lost dignity" through their participation. Suppose the President of these United States and a messenger-boy, unconscious of one another's intentions, race for the one vacant place on a "last car." Has the President "lost dignity" because the lad is the better sprinter, even if finger and thumb are twiddled at him from the rear platform?

—[F.]—

There is reason for believing that the real cause for complaint, the real "competition evil," is to be found in the fact that there are not enough open competitions, not that they are too numerous.

—[G.]—

As the public, when expending public funds for a public building, has an unchallengeable right to procure the best results existing conditions permit, and as it can never be predetermined that some unknown genius may not be able to evolve an infinitely better solution of an architectural problem than can the ablest of known architects, it follows that the public's right can wholly be preserved only by holding a competition which in one stage shall be open to any and all competitors.

—[H.]—

Directors of corporations should hold that their stockholders, and trustees that their *cestui que trusts,* have rights to the best returns attainable, as in the case of the public alone, and they should resort to the same form of competition.

—[I.]—

The obligations of good citizenship should bar the architects in a community from combining in mutual agreement not to compete for a public building, however unfavorable may be the terms of competition, as the result of such combined abstention may be to force upon the innocent public a punishment which is really deserved only by a small fraction of it—the ill-guided building-committee, that is. Individual freedom of action should be left uncontrolled, as the ablest and busiest of architects may be willing to sacrifice personal dignity and profit on the altar of good citizenship.

—[J.]—

The "direct selection" of an architect is ethically correct only in the case of private buildings, where the appointer is responsible to himself alone for the manner in which he expends his money or the return which he gets for it.

—[K.]—

In discussions of competitions by architectural bodies, the rights of the other party in interest—the owner, promoter or the public—are not fairly considered; when presented at all, it is merely as a matter of conscience. They rarely are fairly advocated for what they are worth.

—[L.]—

Since the rights of the public are seldom considered (and more rarely advocated) when the competition evil is under discussion by architectural bodies, it appears all the more obligatory on us to state these views as we understand them and advocate them when they seem just and equitable.

—[M.]—

As the erection of public buildings is unquestionably public business, the method of procuring designs for them is properly a matter for regulation by public statute, and the A. I. A. should direct its efforts to procure the enactment of such statutes, insisting on uniformity of regulation and requirement in the several States. It seems not unlikely that the matter could be brought within the purview of the Interstate Commerce Commission, since architects located in one State habitually carry on business in several others.

—[N.]—

It is the duty of the A. I. A. to "educate the public" by sending to public officials, each New Year's, brief reminders that it stands ready to assist them in organizing, conducting and judging competitions for all public buildings.

—[O.]—

Nothing is less justifiable or more undignified than challenging the conclusions or assailing the fairness of the expert-adviser, who, it should be kept in mind, is employed at the insistence of the competitors themselves.

—[P.]—

It is a fallacy to imagine that an expert-adviser can in any way enforce the adoption of the design he may recommend.

—[Q.]—

As a single judge probably feels a greater responsibility than a full bench, Mr. Colcutt's suggestion that the best decision on a competition is reached by a single judge or expert-adviser, aided and advised by two coadjutors, who, however, have no votes, seems recommendable.

PROGRAMME CONDITIONS.

—[1.]—

No programme should call for drawings at a "quarter-inch scale."

—[2.]—

Competitions should be held for the sake of discovering the best germinal idea, rather than to secure the most completely worked out set of general drawings.

—[3.]—

Honest regard for the stated cost is so seldom paid, either by competitor or judges, that it would be well that the allowable margin of variation should be indefinitely extended. The thing sought is the design for a building that best meets the public needs; that discovered, the public can be counted on to provide the needful funds—sooner or later.

—[4.]—

Two elevations completely worked out, the other elevations being simply blocked in, a section, two thoroughly worked out plans—the entrance floor and one other—and a perspective are enough for the expert-adviser to have to consider.

—[5.]—

The perspective should show, in addition to the front and one side, also the rear-front and fragment of the other side, this being drawn as if a second building standing on the next street corner, lines vanishing to the same points in each case.

TANAGRA FIGURINES.

Among the various objects placed in the grave these statuettes of terra-cotta were by far the most interesting. They formed a little world themselves of infinite variety in which were found every style, every fashion, and every period; figurines of men and women—statuettes of divinities and spirits; jointed figures like puppets, and hollow figures with a stone inside like rattles; animals of every kind; statuettes of every degree of merit—rudimentary or exquisite—all differing from one another according to circumstances and date.

The tiny statuettes vary considerably in size. The largest are as much as fifteen inches in height, while the smallest only measure two or three inches, but the greater number reach a height of about eight inches when seated, from five to seven inches when kneeling, and eight to ten inches standing.

One person endeavors to show, with an astonishing degree of argument, that these figurines, so delicate and fanciful, have a religious and symbolic meaning, and that under their mundane appearance are concealed the great and mysterious divinities of the lower world. On the other hand, another person, with a simpler and more ordinary explanation, seeks for representatives of daily life in these graceful statuettes.

Another question arises as to why these figurines were placed in the tombs, and in order to reach a solution in this respect it may be worth while to recall conceptions which the Greeks held of the life beyond the grave. For them life did not come to an abrupt close at death, but in the tomb where the body was imprisoned an obscure existence was maintained with all the needs and pleasures and desires of humanity. Even at a later time, when the Greeks pictured to themselves that the souls of the dead assembled in hades, their only conception of the future life was as a repetition of life on earth.

It was, therefore, the duty of the living to supply food to the dead, who continued an existence in the tomb, and for this reason wine, cakes and milk were placed upon the grave, and this is also why on occasional anniversaries funeral banquets were celebrated there, at which time the shade of the dead man was thought to be present, although invisible. It was the sacred duty of the living to see that in the solitude of the tomb the departed

were surrounded by objects they had cared for on earth, and therefore these things were all placed in the tomb.

It was also thought that they must take their friends and companions down with them into the other world in order to recommence their pleasures there. For this reason horses and dogs were buried with them, and in early times slaves and captive women were often sacrificed that they might go down to hades to wait upon the departed or enliven his lonely existence. To cheer the departed in the depths of the tomb and to protect him during the dangerous journey was the twofold desire by which the piety of the survivors was inspired. The Egyptians placed statuettes in the tomb to answer to the summons of the departed and to aid him in the cultivation of the celestial fields and to form a devoted escort around him, and to secure him immortality.

The Assyrians, from a similar motive, placed in their graves figurines designed to avert the hostilities of the chthonic powers, and this, too, is the object of the sepulchral idols found in the ancient burial grounds at Rhodes, which represented the guardian divinities of the tomb and afforded escort and society for the departed.—*Academy Notes.*

COMMUNICATION

COMPETITIONS.

January 14, 1907.

To the Editors of The American Architect:

Dear Sirs:—I have been reading the editorials in *The American Architect,* relative to competitions, with regret.

Much that you write is obviously true, but do you think that your attitude is either justifiable or helpful? You seem to assume that the moment a man has a practice and has made a name for himself he becomes a selfish, grasping and thoroughly mercenary practitioner, and if he fails to approve of competitions—either as a matter of conviction or because a particular competition or the terms under which it is conducted do not appeal to him—then you place him absolutely out of the pale.

Far be it from me to enter the controversy. There is so much to be said on both sides as to the merits and demerits of competitions and as to the manner in which they should be conducted in order to be fruitful, and personal opinions necessarily vary so greatly and change with each problem or condition that there is little or no benefit to be derived from an academic discussion of the matter.

I believe in competitions myself. I have entered a great many competitions, a number of them without any chance of reward, and as a matter of public spirit, but the thing that upsets me in your attitude and that impels me to write to you is that placing my thirty years of experience against yours, on opposite sides of the same question, you as an observer and I working in the ranks, I have found architects as a class and as individuals ready to respond to any call of duty in their profession, and holding the most amiable, not to say generous, relations towards each other. I have heard about "wire pulling" and all manner of indecencies. I have seldom met them. I have seldom come face to face with a man who was jealous of my success or of any other fellow-architect's success, or who was deliberately scheming to secure work by setting himself apart as an individual or as a class, either as an older architect or a leader of the profession, as you seem to particularly enjoy designating them.

Architects are human. They have their failings and their weaknesses like other men, but I think that you go beyond what is fair, just and true, in trying to present the subject of competitions as if the younger men and the older men were endeavoring to pull each other's eyes out, or as if the man who has a practice was trying to prevent his fellow-architect, who is struggling to obtain one, from succeeding.

Pray do not misunderstand me for one moment as resenting personally your attitude. I don't consider myself involved in the least. I am neither a leader, an old man nor a young man. I have gone into competitions. I believe in them. I also believe in direct appointment. It all depends on circumstances and on the sincerity and purpose of the client.

I cannot agree with you that when a man has attained distinction in his profession it is an injury to the younger man that his distinction should be recognized, any more than in any other profession, and what is more to the point, in my thirty years of experience I fail to remember a single instance of a man having real ability who has failed of real success, or a man who has attained real success undeservedly. The character of the ability and its degree is not always the same, but at the bottom of it there is always a reason (and one that we cannot control) which will come to the surface for either success or failure, and competitions cannot change this result. They may bring a man to the surface a little earlier, perhaps so early as to do him positive injury. That is the real danger. On the other hand, they may prevent the best man from being employed, if they are of such a character as to keep him, whether young or old, prominent or not, from competing.

When we look back, say for twenty-five years, we are impressed by this fact, that most of the best work, and the work that can be considered as representative, has been the result of direct appointment, and that by far the greater part of the work produced as a result of competitions has been distinctly inferior; much of it indifferent, and even bad. The best work produced as a result of competitions, with a few exceptions (so few as to hardly justify the method), has been produced by men who obtained the work in competition, but whose professional achievements would have justified their direct appointment, and the reason has been that the problem either did not justify the competition or that the competition was not properly conducted.

I think it would be so helpful if a magazine like yours could discuss this matter impartially and without taking sides, allowing the interested parties to discuss the details and crediting all parties concerned with good faith.

My purpose in writing to you is entirely friendly, and in the hope that you may take a broader view of the entire matter, and not assume that there exists an attitude of antagonism on the part of any set of architects as against any other set, especially so in view of the fact that I know that the architects themselves, whatever their views on the subject of competitions, do not sympathize with your attitude. Very truly yours,

John M. Carrère.

[Suppresio veri is not exactly the crime that we might have expected would ever be brought against us. But since it is charged, we will say explicitly that never, within our recollection, have we refrained from publishing contributions to any discussion, no matter how savagely their authors might rend us or how fallacious they might prove our own contentions to be.

With this premised, we will assert our belief that our recent exposition of the competition problem was unquestionably "justifiable," and we know it was intended to be "helpful" towards producing the best concrete results.

Our recent remarks have been limited to advancing the merits of the method of the "compound" competition in the case of public buildings, and only incidentally were they directed against the method of appointment by direct selection. On considering our correspondent's very strong reprobation of this course of ours, it has occurred to us to examine the matter from the standpoint of the public itself, who, of course, are in the main concerned only with results, and, after a mental survey of the public and semi-public buildings in this city, we have arrived at this interesting result, the parallel lists showing how in each instance the several designs were procured:—

ERECTED AFTER COMPETITIVE DESIGNS.

New York Public Library, Carrère & Hastings, Archts.
New Theatre, Carrère & Hastings, Archts.
U. S. Custom-House, Cass Gilbert, Archt.
Union Club, Cass Gilbert and J. Du Fais, Archts.
College of the City of New York, G. B. Post & Sons, Archts.
Produce Exchange, G. B. Post, Archt.
Stock Exchange, G. B. Post, Archt.
World Building, G. B. Post, Archt.
Cathedral of St. John the Divine, Heins & LaFarge, Archts.
St. Luke's Hospital, Ernest Flagg, Archt.
General Grant's Tomb, J. H. Duncan, Archt.
Soldiers' and Sailors' Monument, C. W. & A. A. Stoughton, Archts.
Fine Arts Building, H. J. Hardenbergh, Archt.
Jefferson Market Court-House, Withers & Vaux, Archts.

ERECTED AFTER SPECIAL APPOINTMENT.

Hall of Records, J. R. Thomas and Horgan & Slattery, Archts.
Appellate Court-House, A. Page Brown, Archt.
Statue of Liberty Pedestal, R. M. Hunt, Archt.
Lenox Library, R. M. Hunt, Archt.
Metropolitan Museum of Fine Art, R. M. Hunt, Archt.
New City Prison, Withers & Dickson, Archt.
Municipal Courts Building, Thom, Wilson & Schaarschmidt, Archts.
Columbus Monument, Gaetano Russo, Sc.
Columbia University Library, McKim, Mead & White, Archts.
Washington Arch, McKim, Mead & White, Archts.
Madison Square Garden, McKim, Mead & White, Archts.
Metropolitan Club, McKim, Mead & White, Archts.
Century Club, McKim, Mead & White, Archts.

ERECTED AFTER COMPETITIVE DESIGNS.	ERECTED AFTER SPECIAL APPOINTMENT.
Union League Club-house, Peabody & Stearns, Archts.	University Club, McKim, Mead & White, Archts.
Engineering Societies Building, Hale & Rogers, Archts.	Natural History Museum, Cady, Berg & See, Archts.
Engineers' Club, Whitfield & King, Archts.	Hispanic Society Museum, C. P. Huntington, Architect.
Lady Chapel of St. Patrick's, C. T. Mathews, Archt.	Branch Public Libraries, Sundry Architects.

If our correspondent contends that the buildings in the first column are all failures, and that in no case was the best design selected for execution, we think we may assure him that the public feels that the results were good enough, and that it understands that the method of direct appointment can only assure it results that are "good enough," never, with certainty, "the best results obtainable under existing conditions." If he alleges that the competitions caused bitter complainings from the unsuccessful competitors, we, on our part, can recall equally vicious grumblings from those who didn't have the good fortune to be directly selected as architects for the buildings in the second column.

It is possible that our quite innocent use of quotation marks in speaking of "the leaders" of the profession may have created the impression that we intended a slur, and were trying to detract from the reputation of men whom we esteem as personal friends, and whose work we admire and applaud, when it is worthy. Apart from these quotation marks, we are unable to discover indications of that hostile animus against the elders which our correspondent has so easily detected.

Finally, if the "American Architect" has any weight and influence, we surely have had some little hand in securing them, and there seems no good reason why we should not allow the journal's reputation to come inferentially to the support of our views on competitions, as rightfully as if it were a matter of bad ethics or worse building methods we were discussing. Why should we be asked to "discuss this matter impartially" and stop there, without a summing up, or, if it seems desirable, advocating a certain line of conduct?—Eds. "Am. Architect."]

ILLUSTRATIONS

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE, BROAD AND BEAVER STREETS, NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.: FIVE PLATES.

HOUSE OF R. M. GOODLETT, ESQ., KANSAS CITY, MO. MESSRS. ADRIANCE VAN BRUNT & BROTHER, ARCHITECTS, KANSAS CITY, MO.: THREE PLATES.

Additional Illustrations in the International Edition.

HOUSE IN THE UNTERWALDEN STYLE, STANS, SWITZERLAND.

HOUSE AT WILDERSWYL, SWITZERLAND.

A HAMLET AT ZERMATT, SWITZERLAND.

CHÂLET NEAR THE WETTERHORN, SWITZERLAND.

A subscriber in the far Northwest recently made a request for information about Swiss châlets, and in so doing provides us with a reason for publishing a few miscellaneous views we chance to have at hand.

NOTES AND CLIPPINGS

MACHINES FIXTURES IN GERMANY.—Vice-Consul W. C. Schnieder, of Freiburg, reports as follows upon a recent decision of the Imperial Supreme Court of Germany, holding that machinery when installed in a factory becomes a fixture, which decision will be of interest to manufacturers and dealers in machinery in the United States who export to Germany:

"The highest court of the Empire, the 'Reichsgericht,' has lately in a number of cases held that machinery when installed in a factory or manufacturing plant becomes a fixture, and that therefore a sale upon condition that the title remain in the seller until the machinery is paid for, or the lien of the vendor on the goods sold, must give way, in case of the bankruptcy of the buyer, to the rights of his creditors, and the machinery becomes part of the assets of the bankrupt. The rights of the holders of mortgages on the plant therefore have precedence over the rights of the seller of the machinery, no matter on what terms the sale was made. German manufacturers of machinery are strongly protesting against this decision by the court, calling attention to the fact that this ruling is unjust, the mortgagee receiving rights and security upon which he did not rely when he loaned his money, while the seller of the machinery is deprived of rights for which he expressly contracted, and relying on which he sold the goods and gave the buyer credit. It is claimed that this ruling of the court will greatly impede industrial progress, in that it will greatly limit the credit given by manufacturers and dealers in machinery to capable men who are short of capital and need assistance in the shape of credit in establishing new plants or enlarging those already established. In its decision the court has entirely ignored the question of whether the machinery in fact becomes a part of the factory or plant; that is, whether it truly becomes a fixture in the sense in which that term is used in American law, so that its removal or separation from the building would injure or change the latter. In most cases, of course, this is not the case. It is claimed by many that the decision is therefore contrary to the Code of 1900, and that therefore the court will sooner or later change its ruling; but others believe that an amendment to the law will be necessary to repair the damage, and this is believed to be practically impossible, because of the popular prejudice against amending the law so soon after it has gone into effect. Manufacturers and dealers in machinery who deal with German customers should, therefore, be very careful about the credit of their prospective customers and should not rely entirely upon the conditions of their contract of sale securing to them vendor's liens or other means of security by retention of title until payment, etc."

COLLAPSE OF A WIRELESS TELEGRAPH STATION.—During the height of the gale on Thursday, December 6, the wireless telegraphy tower at Machrihanish, Argyllshire, 450 feet high and weighing almost 2,000 tons, completely collapsed. The tower belonged to the National Electric Signalling Company, of Washington, D. C., and was recently established with the object of trying to effect communication between Scotland and America, the station on the other side being at Boston. The tower was a tubular steel structure, containing a stairway leading to the top, and had outside balconies every 100 feet. The stays to the west of the tower were torn from their foundations, and the tower snapped in two places and crashed to the ground. Fortunately, it fell clear of the adjoining buildings and the workers. Nothing daunted, the National Electric Signalling Company have resolved to immediately re-erect the tower. It is estimated that 50 per cent. of the material can be utilized again.—*The Building News.*

ST. PAUL'S CATHEDRAL.—Mr. Macartney, the architect to St. Paul's Cathedral, recently made the following communication to the Press: "Having now submitted my report on the condition of St. Paul's Cathedral, the Dean and Chapter, in view of the grave importance of the matter, have decided, on my recommendation, to invite Mr. T. E. Collcutt, the President of the Royal Institute of British Architects, Sir Aston Webb, R.A., and Mr. John Belcher, A.R.A., to form a committee of inspection as to the condition and circumstances of the structure.

"THAT BASTARD IN ART," THE WASH-DRAWING.—In an article on "The Decay of Illustration," the *Academy* admits that the standard of illustration is higher in America than in England. The inferiority of the art now to what it was in the "golden decade of illustration" is explained as follows:

"The key to this mysterious decadence of illustration, while so many excellent illustrators are found in our midst, will be discovered when we compare the illustrations of the sixties with those of the present day; for, whereas, the former, without exception, are in line, the latter, in the main, are in half-tone. More than to anything else the deterioration of illustration is due to the substitution of that bastard in art, the wash-drawing, for the pure design in line. This preponderance of wash-drawings in the pages of our magazines and illustrated weeklies is the outward and visible sign of an inward and spiritual degeneration. False ideals are responsible for the change which has resulted in decay. Modern illustrators are apt to aim at truth instead of beauty, forgetting that if truth be the goal of science, beauty is the goal of art, and that if, as Keats has said, beauty and truth are ultimately one, nevertheless artists and scientists travel by different roads to the common end. Moreover, the hack-illustrator of to-day seems to adopt the camera as his standard of truth, and to endeavor to obtain with his indian-ink an effect resembling as nearly as possible the reproduction of a photograph. Instead of trying to decorate a page, the hack-illustrator would persuade us that he has 'snap-shotted' some incident or scene described by his author."

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BEFORE it passes into the limbo of forgotten suggestions, it seems worth while to consider a little further the probable usefulness of regulating by public statute the procurement of designs for all public buildings. As we said last week, the erection of public buildings, being indisputably a matter of public business, is as unquestionably a matter that, logically, should be carried on in conformity with fixed statutory requirements. It is illogical and incoherent that the American Institute of Architects, having interested itself actively and successfully in bringing into being and operation the Tarsney Act, and having aided and abetted in the reforming of the methods of conducting business in the office of the Supervising Architect, should feel that it has concern only with the architectural character of National buildings, and should leave that of State, County and Municipal buildings to the ministration of an ever devious chance and the chicanery of those who can work a "pull" with political bosses. Numerically, the three classes of buildings named are to National buildings as five thousand to one, while the ratio of annual outlay cannot be less than a hundred to one. Surely, a field so large, so widely distributed, and yet so isolated and self-contained, where the requirements of the problem, or crop, are so nearly identical, so often repeated, is worthy of cultivation under regulations that will assure the most reputable output.

STATUTORY regulation in the matter of the designing of public buildings, whether such regulation should prescribe some form of competition or direct selection, would go far, very far, toward the extinguishment of competition evils, or at least one of the greatest of them, if not the progenitor of them all, namely, uncertainty, the most insidiously demoralizing of all the evils that attend competitive methods. It is because of uncertainty, the not knowing whether or no a given public building is to be a matter of public competition, that architects, in other respects consistent enough, show themselves so painfully fickle and inconstant, now proclaiming loudly that this particular building must, of course, be open to competition and again asserting that another building of precisely the same kind must be given out by private selection—in the latter case thinking they have the better chance of landing the job. It is through uncertainty that a waste of time and effort arises in the way of manœuvring to get a letter-of-introduction to this man, in convincing that one that yours is the paramount claim, in wandering off with another committeeman to prove to him that a slight variation of a building once designed by you is just the thing that is wanted. It is through uncertainty that the nerves of the "local talent" are wrung, when it is perceived that an outsider may be directly selected or even invited to compete. A fixed and known method, commonly practised everywhere, would rehabilitate many a practitioner's self-respect. It is only a short time ago that in our own columns an architect advertised for a "drummer" to solicit work for him; some one, that is, who would cringe and toady, wheedle and pull wires, in a way that self-respect still kept him from doing for himself.

THE advocates of the direct-selection method assume, of course, that the selection is in all cases to be the best possible one that circumstances admit; but in the case of public work such a selection is more likely to be rare than common. Proof of this may be found in what is going on at this time in the city of St. Joseph, Mo., where certain indignant architects have joined in petitioning the School Board that certain other architects specifically named shall hereafter be barred from school work, the reason being that the School Board seemed to be of the belief that the architects now obnoxious to their fellows were the only architects in the city, and, so, had given them all the school work. We fancy, in the light of this St. Joseph incident, that, if the direct-selection of architects should be carried out with theoretical accuracy, the best selection being made in each case, twelve months would not have passed before ninety per cent. of the architects in the country would be signing petitions of exclusion against the other ten per cent.

THE one seemingly strong argument in favor of direct-selection seems on examination to be particularly formless. It is pointed out that the best archi-

tectural result follows when the architect and client come into direct contact at the start. But, though the argument is sound, it does not count against the competitive method; for, by common agreement, is not it the purpose of a properly conducted competition to secure an architect rather than a design? And is it not a matter of common knowledge that the first thing done by the winner of a competition is to get into close contact with his employers so as to make his design conform as absolutely as possible to their requirements? In our own experience, as editors, we have always found it difficult to secure for publication the design which actually won the competition, the winner's response being almost invariably: "Oh, I shall so alter and improve the design, after consultation with the authorities, that I don't care to have drawings published that will be so unlike the actual result." Is not, so far as the employer is concerned, the balance all in favor of the competition method, since he comes to the final discussion with the executing architect with a knowledge of the problem derived from the competition which he could not have had at command in dealing with a directly-selected architect?

WE know very well that, of late, a strong feeling in favor of direct-selection has been worked up, and that in expressing our disbelief in that theory we are running counter to the views of many who have given the matter as much and as serious consideration as we have. But as it is our belief that their consideration has been largely one-sided and that the matter has been viewed from within, not from without, we feel bound to express ourselves with emphasis and to say plainly that we think the authorities—and it must always be remembered that, as the client holds the purse, the architect has more need of him than he has of the architect—will feel that the theory of direct-selection is against good public policy. It would be intensely disagreeable, and somewhat disconcerting, for the public authorities to say to the architects: "Gentlemen, we esteem it our right to 'shop' as freely for our architectural designs as we do for our own clothes. If you are unwilling to display your line of goods, we will turn to the engineers, the building corporations and the department-stores"—agencies that even now are striving to induce the public to believe that architects are negligible quantities.

WE are sorry to note that a bill for the licensing of architects has just been introduced in the Indiana legislature, and though we do not know its genesis we presume it has been introduced by some body or clique of architects who imagine that the meagreness of their own incomes is due to the fact that they are not tagged and labeled. Our own belief, more than once expressed, that such license laws are unconstitutional is supported by the citation from a ruling recently made in a Washington court that may be found in another column. It is curious that the one form of license that we feel is excusable, if not constitutional, is the one form that excites most opposition amongst architects, and this is the requirement that obliges foreign architects desiring to practice temporarily in a license-burdened State to take out licenses, quite as if natives. We believe there is an excuse for exacting a fee from a foreign architect in the same way and for precisely the same reason that a license is exacted from traveling circuses and from drummers. These come into a State with the sole purpose of withdrawing from that State as much of its circulating medium as they can get hold of, and the license-fee exacted is but a small offset for the protection given them by the State laws while they are there. As a foreign architect, so far as his own purse is concerned, has exactly the same object in view as a circus manager, the exaction of a license-fee seems reasonable, and yet it is this condition that meets most objection.

IN these days of "erecting bronze tablets," as the newspapers phrase it, to mark historic sites, particularly those of battles, such a tablet might have been placed in Copley Square, Boston, which could have declared to all that the inexpressibly inartistic aspect of the place stood as a memorial to the astuteness of real estate operators who knew how, a dozen years ago, to defeat the efforts made by the Boston Society of Architects to relocate and improve the square. Lately there has been a revival of interest in the matter, perhaps owing to the recent demise of the City Forester, Mr. Doogue, much respected but of all too florid taste in the matter of color. Mr. William Atkinson presented a very ingenious treatment, simple, logical and not too expensive, and Mr. George Tilden, feeling it hopeless that the sunken garden, suggested by Rotch & Tilden and approved by the Boston Society of Architects, should ever be accepted by the city, proposed an even simpler treatment, accepting as inevitable the "Huntington Avenue trolley tracks which cut a great gash across the square," and proceeding to obliterate them, or make them as inconspicuous as possible, by paving the centre of the square in a gigantic diaper-work of colored stone, making the joints of his mosaicwork parallel and normal to the direction of the car-tracks themselves. A small appropriation has at length been secured, and the square is to be relocated by Mr. C. H. Walker, whose scheme was placed second in the competition of years ago.

IN addressing the architectural students at the Massachusetts Institute of Technology, when he visited Boston, Sir Aston Webb touched upon a point that is too often ignored, a matter that seems likely to be more than ever lost sight of by those guided by the Society of Beaux-Arts Architects into the belief that what is taught over the drawing-board is the all-important thing. Sir Aston said: "You will be very apt to think of nothing but architecture. An architect ought to be a cultured man. He has to move among cultured people, and if he is not as cultured as they are, he is put to a very serious disadvantage. He is not well provided unless he has read a great deal and has some other accomplishment. Architecture, if it is going to do any good to any one, and if it is going to be more than what a builder can do, must have the particular qualities of beauty, must say something in a beautiful way. An architect may be successful yet do very little work, if it is done well and beautifully."

THE SANITARY FEATURES OF MARKETS AND ABATTOIRS.[1]—III.

LET us now turn our attention to the public abattoirs or organized slaughter-houses of cities. The modern general tendency towards centralization, which we find in so many large and successful industries, has in recent years been applied to the places or buildings where animals are slaughtered. The prime object of public slaughter-houses is to do away with the nuisance, which was in former times so common, of doing the slaughtering in private yards or in butcher-shops scattered throughout the various districts of a city. In the large cities in particular it was found to be almost impossible to exercise a proper control of private slaughtering establishments. The effort toward centralization or concentration of this important industry came about principally through the desire, from the public health point of view, to secure a more careful and strict control of the live animals as well as of their meat.

It became obvious long ago that it was uneconomical, unsanitary and impracticable to slaughter live-stock at the butcher-shops or the selling places for meat.

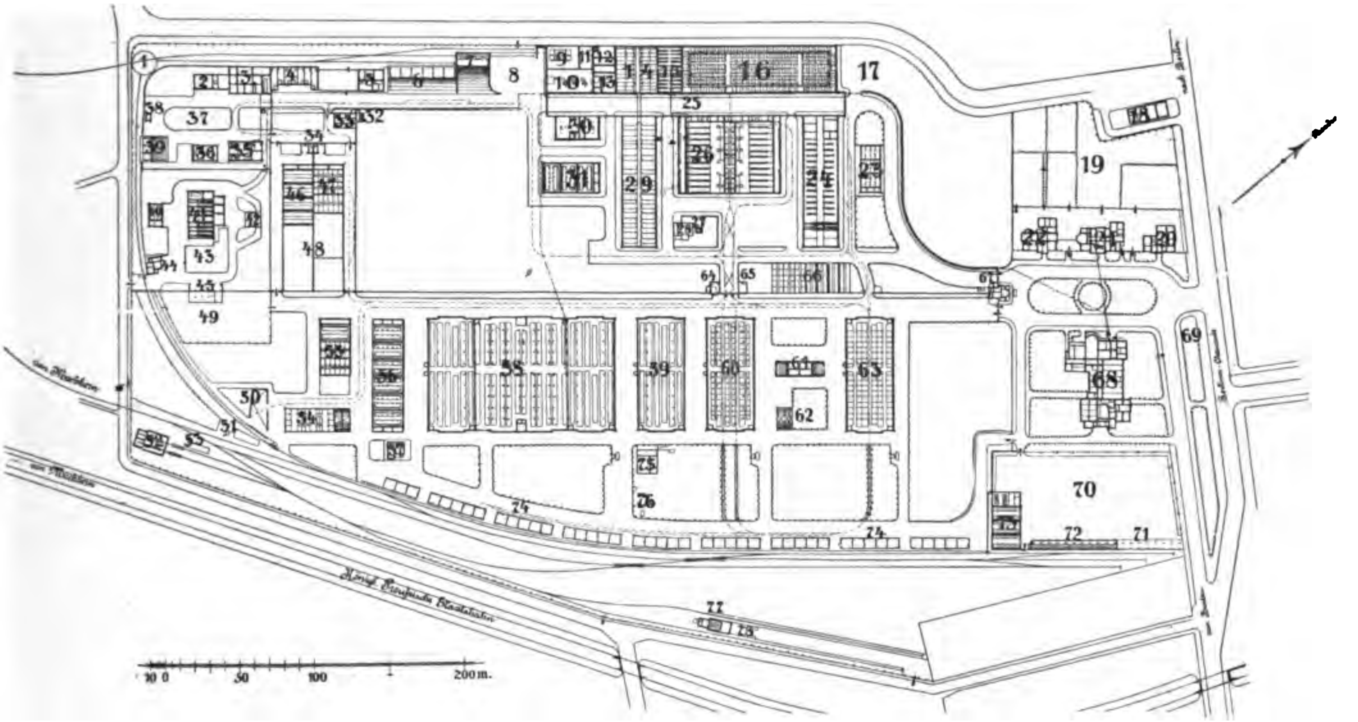
The only proper remedy consists in the concentration of the business of killing animals intended for food and the erection of of central public abattoirs and chief amongst these are the following:

First:—They do away with all the injurious features previously mentioned connected with private slaughter-houses when these are scattered among the populous city districts. The public health is considerably improved by the abolishment of the ill-kept private slaughtering establishments, which generally reek with filth and hence become offensive to the entire neighborhood. The public health is protected because the slaughtering business is carried on in the public abattoirs on sanitary principles, because cleanliness is maintained and good order and business system prevail.

Second:—Offensive odors and disagreeable noises connected with the slaughtering business are either removed entirely or reduced to a minimum. Unsanitary conditions, resulting in the pollution of the soil, the air and of surface and underground waters, are removed.

Third:—The street traffic is benefited because the driving of cattle through the city streets is either done away with entirely or considerably reduced. This in turn facilitates the maintenance of the streets in a clean condition.

Fourth:—The sanitary inspection of the animals before slaughtering, and of the meat after killing, is greatly facilitated and performed in a more organized and careful manner. The sale of



1. Turntable.
2. Cattle-shed.
3. Flaying Establishment.
4. Salting of Hides.
5. Tallow Melting.
6. Unloading Platform.
7. Manure-house.
8. Coal-shed (Building for).
9. Boiler-room.
10. Engine-room.
11. Lighting Plant.
12. Shop.
13. Refrigerating Machine.
14. Pre-cooler for Cattle.
15. Pre-cooler for Small Stock.
16. Large Cold Room.
17. Wagon-shed.
18. "Freibank"—Sale of Cooked Inferior Meat.
19. Garden.
20. Houses of Officials.
21. Administration Building.
22. Inspector's Building.
23. Shed for Small Stock.
24. Slaughter-room for Small Stock.
25. Connecting Passage.
26. Slaughter-room for Hogs.
27. Ventilating-shaft.
28. Cantine.
29. Slaughter-room for Cattle.
30. Tripe-house.
31. Cattle-shed.
32. Lavatory.
33. Fodder-shed.
34. Manure Pit and Lavatory.
35. Slaughter-house.
36. Stable for Small Stock.
37. Police Slaughter-house.
38. Manure House.
39. Unloading Platform.
40. Stable.
41. Slaughter-house.
42. Manure-house.
43. Horse Slaughter-house.
44. Administration Building.
45. Wagon-shed.
46. Stable for Cattle.
47. Stable for Small Stock.
48. Shed for Left-over Cattle.
49. Place for Storage.
50. Manure Pit.
51. Switch.
52. Locomotive-house (Shed).
53. Coal Platform.
54. Straw-shed.
55. Stable for Live Stock.
56. Stable for Cattle.
57. Railroad Station.
58. Market Place for Cattle.
59. Market for Small Stock.
60. Market Place for Pigs.
61. Loading Platform.
62. Hog-washery.
63. Market for Small Stock.
64. Disinfecting-house.
65. Tax Office.
66. Shed for Infected Cattle.
67. Porter's Lodge.
68. Bank Offices.
69. Toilet.
70. Wagon-yard.
71. Wagon-shed.
72. Horse Stable.
73. Stable for Harnessing.
74. Loading Platform.
75. Cantine.
76. Veterinary's House.
77. Disinfecting Plant.
78. Cleaning Platform.

CATTLE MARKET AND ABATTOIR, BRESLAU, PRUSSIA.

central abattoirs or public slaughter-houses, removed from the crowded city districts to the city limits, and simultaneously with this the abolition of all small private slaughtering-places located in the heart of the city. But in order to render public abattoirs successful it is absolutely necessary that the municipality should have the legal right to prohibit private slaughtering, to establish laws making the slaughtering at the public abattoirs *obligatory,* and to make rules and regulations insuring the killing of cattle and hogs and the preparation of animal food products under conditions favorable to the public health.

Numerous advantages arise to the city from the establishment unwholesome or diseased meat is more efficiently prevented.

Fifth:—The butchers are offered better facilities for the killing of the animals and the dressing of the meat; the killing is done in a humane way and under the constant superintendence of qualified inspectors. Owing to increased facilities for the storage and keeping of the meat, the latter does not so readily spoil. Moreover, better facilities exist for the maintenance of cleanliness.

Sixth:—Central abattoirs also facilitate the disposal, prompt removal, or commercial utilization of the numerous waste-products of slaughtering. The hides, the blood, the fat, the bones, the entrails and the offal are taken care of in properly arranged establishments, which form adjuncts to the slaughter-houses.

[1]Continued from No. 1618, page 204.

Seventh:—In case of cattle epidemics, there is a better control of the animals to be butchered.

Eighth:—In large abattoirs slaughtering is done more economically, hence the prices of meat are better regulated or kept lower. The entire business is accomplished in a more orderly and systematic manner, a steadier supply of meat is furnished and a scarcity in the meat supply cannot so easily occur.

Large public abattoirs may be built and erected, first, by the municipality; second, by butchers' associations or corporations; third, by private individuals or firms.

In Europe, municipal abattoirs are the rule and there are only a few instances of abattoirs erected by private individuals. In the United States the majority of abattoirs are built by butchers' associations (for example those of New York City and that at Brighton, near Boston), while others are established through the enterprise of private firms.

It seems generally preferable to have public abattoirs built and controlled by the municipality, for the slaughtering of animals for food and the inspection of the meat involve sanitary problems which should be under the control of the sanitary police. In some instances the meat inspection and control is performed by the State Board of Health, and in some very large abattoirs, from which meat is exported to foreign countries, there is a Government inspection. There is no doubt but that large central public abattoirs erected by the city offer the best solution of the problem of the sanitary control of the meat supply. Cleanliness and sanitation can be enforced efficiently only where these buildings are owned by the city. When this is the case, the city rents the slaughter stands or compartments to the butchers and in this way the abattoirs become a source of considerable municipal revenue.

It is interesting to review very briefly the historical development of the public abattoir. Ancient Rome had such public slaughter-houses and a guild of butchers existed during the days of the Emperors, whose members were privileged to kill animals intended for meat supply and the slaughtering was done in special buildings. With this single exception, there did not exist in any country previous to the beginning of the 17th century any organized system for the slaughter of cattle. The butchers usually slaughtered the animals on their own premises, hence the official meat inspection was very difficult and often proved quite insufficient. The annoying odors from the scattered slaughter-houses constituted an enormous sanitary evil.

The public abattoirs may be said to have originated at the beginning of the 19th century in France. The Emperor, Napoleon I., to whose active interest, as I have already mentioned, we owe the establishment of the first public market-buildings in Paris, gave the matter considerable attention. Recognizing the many sanitary, commercial and economical advantages due to centralized public abattoirs, he authorized and ordered their construction in the suburbs of Paris in the year 1807. He issued at the same time a decree forbidding entirely all private slaughtering in the small shops, and three years later, in 1810, he caused laws to be passed applying to the entire country. In 1815 five public slaughter-houses were opened, covering 38 acres of ground, which were considered models of construction and internal equipment. Since then many large cities of other European countries, and even some smaller towns, have followed the example of Paris and erected public abattoirs. Even the use of the French word "*abattoir*" has gone over into the English and German languages. In Prussia a law was passed in 1868 prohibiting the slaughtering of cattle anywhere except at the public abattoirs. In order to show the rapid increase in the number of such public buildings, it may be mentioned that in 1870 Germany had about 80 abattoirs, in 1896 over 600, and in 1902 836 public abattoirs, of which 71 had also large stock-yards connected with them. In no other country has so much been accomplished in the matter of municipal abattoirs in recent years as in Germany, and some of the large German establishments have been followed elsewhere as models of construction and equipment.

American cities could profit greatly by studying the best examples existing in the older civilized countries. In the United States many private abattoirs and packing-houses of great size exist, particularly in the large Western cities, which are also the centres of the cattle market, such as Chicago, Kansas City, St. Louis, Cincinnati and Louisville. The largest central live-stock depot and the largest abattoir in the United States is at the Union Stock Yards at Chicago. In New York City slaughter-houses prior to the year 1866 were scattered over all parts of the city, to the great detriment of the health of its inhabitants, but in more recent years several central abattoirs have been erected by private enterprise and the most recent example will be again referred to farther on as a model of construction. In Boston large abattoirs were built at Brighton in 1870 under the supervision of the State Board of Health. Some of the public abattoirs of American cities are immense establishments fitted up with the most elaborate and latest improved machinery for the rapid performance of the work and for the humane killing of a very large number of animals; they also have well-arranged auxiliary buildings intended for the sanitary and commercial disposal of the offal incident to slaughtering.

Not all of the existing abattoirs, however, are models of construction from a sanitary point of view; in fact, in many of these buildings unsanitary conditions, forming a menace to the public health, exist. Not a few of the structures are of wood and dilapidated, the ground beneath the buildings is soaked with blood and putrefying filth accumulated during many years. Many buildings lack proper sewerage facilities, the floors are soaked, slimy and slippery, and are not properly washed or flushed, the walls are spattered with blood, grease and hair, or covered with mould. Even the processes of slaughtering and dressing the animals are carried on in an uncleanly and unsanitary manner; the workrooms are poorly lighted and unventilated, the windows obscured with dirt; inside rooms, without light or air, are crowded with workmen and working girls, who are compelled to breathe the air rendered unhealthy by exhalation of rotten wood and decaying meat-scraps or putrefying grease. The work-tables, the meat-racks and the receptacles are inadequately cleaned. No attention is paid to the provision of proper and decent toilet-rooms and lavatories for both sexes; the inadequate provisions made are sometimes found located in corners of the very work-rooms; there is a general lack of consideration for the health and the comfort of the employes. Conditions such as I have briefly mentioned would even appear to be the rule rather than the exception.

Reference was made to these deficiencies and faults in an article by Dr. Stiles on "The Country Slaughter-house as a Factor in the Spread of Disease," published in the "*Year Book of the Department of Agriculture*" for 1896, and more recently public attention has been drawn to this indescribable state of affairs, not only by the statements contained in Upton Sinclair's book, "*The Jungle,*" but also by the report of the investigation, made at the request of the President of the United States, by Dr. Chas. P. Neill, Commissioner of Labor, and by James P. Reynold, Esq., Sociologist. It is perhaps to be regretted that the commission entrusted with the work of investigation did not include a sanitary expert, but it is reasonably certain that if laymen could find and enumerate so many defects as are mentioned in the report referred to, still graver sanitary defects would probably have been discovered by a more thorough technical investigation.

The immediate effect of the publication of the report has been that numerous improvements in the sanitary arrangement and equipment of many abattoirs were carried out; also that stringent rules and regulations were passed by the United States Department of Agriculture for the proper inspection of meat.

It should be mentioned that the large abattoirs of western cities have always attached to them immense packing-houses in which the preparation of meat food products, sausages, canned meats, etc., takes place. It is quite obvious that an official sanitary inspection of such incidental trades, which form a very important modern industry, is quite as much required as that of buildings where only slaughtering is done. The considerations given in the following pages, however, refer only to the latter class of buildings.

The site for a public abattoir should be chosen in the outskirts of a city; it should be isolated, yet easily accessible from all sides. There are a few good examples of abattoirs located within built-up city districts, but as a rule an outside location is preferable, as it does away with the noises and smells inevitable where many animals are kept together ready to be slaughtered. In no case should abattoirs be placed in close proximity to residential districts. In selecting a site the important questions of water-supply, drainage and convenient traffic connections must be duly considered. Where the town is located on a river, it is preferable to put the abattoir below the town. The site should offer facilities for the transportation of the cattle, good connections by rail, by water, and by the country highways in localities where the adjoining rural districts are devoted to cattle-raising.

A large area of suitable ground is required, because a public abattoir is really a conglomeration of many buildings. Sufficient acreage should be acquired or set aside to permit future extension and growth. In nearly all cases the markets for cattle to be sold for slaughtering, sometimes called "stock-yards," are placed adjacent to and in immediate connection with large abattoirs. By

thus combining the live-stock market with the slaughter-house, the sanitary inspection of the meat supply of the city is rendered more concentrated and proportionately more efficient and simple. The site for cattle-yards should be elevated and dry. A liberal area of space is required for cattle-pens, sheds and other adjuncts. The sheds are usually grouped around paved yards, and the drainage of roadways between the sheds of the yards, and of the sheds themselves, requires the closest attention. There should be convenient connections with the railroads and wide platforms for the unloading of the animals from the cattle cars. In connection with large stock-yards, there should always be a well-appointed disinfecting-station for the cattle-cars.

W. P. GERHARD.

(*To be continued.*)

CONCRETE AGGREGATES.[1]

WE may conclude from these and experiments of a similar character that Portland cement concrete at one month old does not approximately reach more than 33 per cent. of its ultimate strength, and at three months 50 per cent. The nature of the aggregates and the quality of the cement will obviously influence the result to a large extent, but the assumption is that both are of the best description.

At this point it may be well to call attention to the floor and other tests for concrete specified in many cases at the present time to be made at a month, when they are supposed not only to stand the maximum stress but a factor-of-safety in addition. It is a question whether many floors which have undergone this test have not been permanently weakened through over-strain. No floor should be tested under three months, and if it will stand the specified test then it will undoubtedly be 30 to 50 per cent. stronger in course of time, always assuming the best and proper materials are employed. The common assumption appears to be that concrete must possess a considerable margin of strength over and above all possible requirements, in case the strength might diminish hereafter; whereas—always again assuming that materials and workmanship are good—it is about the only material in a building that goes on increasing in strength for years.

Where a choice permits, it is worth noting that certain aggregates allow a smaller proportion of cement to be used therewith than others, without a corresponding diminution of strength, as Mr. Grant proved by the following experiment, in which the proportion was one of Portland cement to 10 parts of various aggregates, the blocks measuring 12-ins. cube, and tested at the end of a year:—

Crushed at tons.		Aggregates 10 to 1
Air	Water	
48½	48	Ballast
50	60½	Granite
53	75	Glass
60	52	Slag
72½	78	Portland Stone
70	98	Flints
90	100	Pottery

The result of this experiment proves that flints make concrete at one to ten nearly equal in strength to pottery, while glass is superior to slag.

The results are considerably at variance with experiments made with one of cement to six of an aggregate. The results of the above tests, which were the averages of a large number of experiments, somewhat upset previous experiments and all theory as to the strength of concrete made with different aggregates, for flint takes nearly the top place, Portland stone the third, and but little superior to glass, while Thames ballast comes last.

Flint surfaces are of a glassy, impervious nature, and this experiment tends to prove that aggregates of a non-absorbent character make better concrete when the proportion of cement is low than previous ones. Flints, whether obtained from chalk strata or picked from the surface of agricultural lands having chalk subsoil, should be washed and broken with a crusher—hand-breaking is quite useless for the purpose—and in this way an aggregate of a suitable nature and consistency is obtained without the admixture of any other materials; but the washing is better and more quickly performed after they are crusehd, as the clay, marl, or chalk, which adheres thereto, is broken up into minute particles and much more readily got rid of, and the washing is more easily and economically performed on the mixing board, laid to a slight inclination, at the time the concrete is required. If the inclination is too great, the sandy element is carried away with the water; the boards should be adjusted to avoid this loss.

[1]Extracts from a paper by Mr. Thomas Potter in "The Builders' Journal."

River gravel, when obtained from sluggish streams, has often fine muddy clay, washed in from the banks, attached thereto. This should also be eliminated by washing. Thames ballast is not always of one quality, as every London builder knows; it depends upon what part of the river it is obtained from.

Ashes from locomotive and engine furnaces generally make excellent aggregates, as before stated, if not intermixed with engine-room sweepings and coal dust, while coke breeze, whether of the ordinary kind or pan breeze, is scarcely inferior. The word "breeze" has been used to describe other materials beside coke residue—the screened ash-bin refuse of private houses and public buildings, for instance—so that a clear understanding is often necessary as to what the breeze is composed of, and the source from which it is obtained; the different descriptions of coal produce, too, very different qualities of coke breeze.

Old bricks from buildings in course of demolition make good concrete if broken with a crusher, but not if hand-broken. They should be roughly cleared of old mortar—plastering mortar especially—while, if smoked and soot-laden, they should only be used in foundations. If used for walls, floors, or ceilings, where the latter are formed by plastering direct on the concrete, stains will inevitably appear in course of time.

Old tiles, slates and similar materials are, as a rule, unfit for an aggregate; they are unshapable and impregnated with smoke and impurities.

Specifications often describe aggregates to be composed of different materials in certain proportions, such, for instance, as five parts of clinkers or broken-brick débris, and one part of sand or coke breeze; but the object is not clear. We seldom hear of cement mortar being made with cement and two different kinds of sand. In my experience the best aggregates are those in which the material is of one description throughout; if, however, Thames or other sand is added, through an insufficiency of the smaller element, that is a different matter, and cannot, perhaps, be avoided.

Many failures with concrete have taken place from causes unknown at the time it was used. Slag, unless it has been allowed time for aeration by exposure to the atmosphere for a year at least, to get rid of the sulphur contained therein, will disintegrate the concrete. Many failures have happened from using slag not sufficiently aerated: otherwise it is one of the best aggregates.

Aggregates by rail have been conveyed in trucks previously used for the conveyance of lime, portions of which have got intermixed therewith, and, being unnoticed, have caused the concrete to blow or burst. This is not of frequent occurrence, but has happened. The aggregate should not be deposited near a lime shed, nor where plasterers are running lime for plastering, as pieces of unslaked lime, or lime core screenings, may inadvertently find their way among the concrete material. Numerous failures have occurred through pieces of lias limestone having passed through the furnaces of locomotives and mixed with the ashes which were afterwards used for making concrete. It is the practice on some lines of railways to give the drivers gratuities when the consumption of coal is below or not over the average, and where lines pass through lias-limestone districts the drivers have found that lumps of limestone, when mixed with the coal, economize the latter. I have seen a large flight of concrete stairs and floors completely wrecked as a result.

Thames ballast and sand often contain pieces of coal, which may have been thrown overboard, or in some other way got mixed therewith. It used to be thought that the coal expanded and burst the concrete, but late trials do not confirm this view, although "blisters" in cement facing to walls have been traced to minute pieces of coal forming the cores thereof having burst the cement. Explanation of these opposite results I am unable to give.

Obviously, aggregates for floors and walls—the former more especially—should be fire-resisting to a high degree, and the best fire-resisting aggregates have passed through fire or have withstood a great heat without disintegration, such as slag, furnace ashes, coke breeze, clinker, brick, and tile-yard débris, and burnt-clay ballast. Some of the floors tested for fire-resistance by the British Fire-Prevention Committee had Thames sand mixed with otherwise good fire-resisting materials. Thames sand, being the finer portion of flints formed by attrition, is a bad material to withstand fire, and the results were less successful than probably they otherwise would have been.

Captain Shaw, at one time Superintendent of the Metropolitan Fire-Brigade, was in the habit of cautioning firemen from entering buildings on fire which had concrete floors made with Thames

ballast and Thames sand. These were in the habit of collapsing when a fire occurred and without any warning.

The use and selection of aggregates for concrete purposes has too commonly been considered of small consequence, and it has been held that anything—clean or dirty—will answer the purpose equally as well, an idea which to some extent I shared myself very many years ago; but, soon discovered that, like other things in life, we learned more from failure than from success.

UNCONSTITUTIONALITY OF ARCHITECTS' LICENSE LAWS.

THE unconstitutionality of State laws requiring architects to practise under a license and forbidding those to practise who cannot procure one, is clearly affirmed by implication—since architects are explicitly mentioned—in the following ruling of the Supreme Court of the State of Washington, in which the unconstitutionality of the plumbers' license law is affirmed.

Judge Rudkin, who delivered the Court's opinion, said, in part:

"THE power of the legislature to make all needful rules and regulations for the health, comfort and well-being of society can not be questioned, but there are certain limits beyond which the legislature cannot go, without trenching upon liberty and property rights which are safeguarded by the State and Federal constitutions. As said by the court *In re* Jacobs, 98 N. Y. 108, 50 Am. Rep. 636: 'The limit of the power cannot be accurately defined, and the courts have not been able or willing definitely to circumscribe it. But the power, however broad and extensive, is not above the constitution. . . . Generally it is for the legislature to determine what laws and regulations are needed to protect the public health and secure the public comfort and safety, and while its measures are calculated, intended, convenient, and appropriate to accomplish these ends, the exercise of its discretion is not subject to review by the courts. But they must have some relation to these ends. Under the mere guise of police regulations, personal rights and private property cannot be arbitrarily invaded.' And *In re* Aubrey, 36 Wash. 308, 78 Pac. 900, 104 Am. St. Rep. 952, this court said: 'It may be stated as a general principle of law, that it is the province of the legislature to determine whether the conditions exist which warrant the exercise of this power; but the question, What are the subjects of its exercise? is clearly a judicial question. One may be deprived of his liberty, and his constitutional rights thereto may be violated, without the actual imprisonment or restraint of his person. "Liberty" in its broad sense, as understood in this country, means the right, not only of freedom from actual servitude, imprisonment or restraint, but the right of one to use his faculties in all lawful ways, to live and work when he will, to earn his livelihood in any lawful calling, and to pursue any lawful trade or avocation. All laws, therefore, which impair or trammel these rights—which limit him in his choice of a trade or profession—are infringements upon his fundamental rights of liberty, which are under constitutional protection.'

"We cannot close our eyes to the fact that legislation of this kind is on the increase. Like begets like, and every legislative session brings forth some new act in the interest of some new trade or occupation. The doctor, the lawyer, the druggist, the dentist, the barber, the horseshoer, and the plumber have already received favorable consideration at the hands of our legislature. and the end is not yet, for the nurse and the undertaker are knocking at the door. It will not do to say that any occupation which may remotely affect the public health is subject to this kind of legislation and control. Our health, our comfort, and our well-being are materially affected by all our surroundings—by the houses we live in, the clothes we wear, and the food we eat. The safety of the traveling public depends in no small degree on the skill and capacity of the section crews that build and repair our railroads, yet are we on this account to add the architect, the carpenter, the tailor, the shoemaker, those who produce and prepare our food, and all the rest to the ever-growing list? If so, it will be but a short time until a man cannot engage in honest toil to earn his daily bread without first purchasing a license or permit from some board or commission. The public health is entitled to consideration at the hands of the legislative department of the Government, but it must be remembered that liberty does not occupy a secondary place in our fundamental law. Under some of the acts to which we have referred members of the board of health form part of the examining board, but our act has not even this saving grace. By its terms two master plumbers and one journeyman plumber are constituted the guardians of the public health and welfare. We are not permitted to inquire into the motive of the legislature, and yet, why should a court kindly declare that the public health is involved, when all the rest of mankind know full well that the control of the plumbing business by the board and its licensees is the sole end in view. We are satisfied that the act has no such relation to the public health as will sustain it as a police or sanitary measure, and that its interference with the liberty of the citizen brings it in direct conflict with the Constitution of the United States.

"The judgment should be reversed, and the prisoner discharged; and it is so ordered."

Judge Root, concurring, also said:

"To the foregoing may be added this thought: The liberty and natural rights of a citizen—such as his privilege to engage in a lawful vocation for a livelihood—can be denied him by the legislature only where such deprivation is necessary to accomplish a given result essential to the welfare of the public. If that result can be attained in a practicable manner without interference with such liberty and rights, there is an absence of that necessity which is an essential and prerequisite to the validity of such a statute.

"In the case at bar the only justification urged in behalf of the statute is that good plumbing is necessary to the health of people in cities having over 10,000 inhabitants. Avowedly it is sought to insure good plumbing by means of this statute. It is self-evident that the same, or a better, result can be obtained by means of statutes or ordinances requiring good plumbing, and insuring it by means of adequate inspection. Such a statute or ordinance would not interfere with the liberty or natural rights of any person, and would safeguard the health of the public as fully as or more so than the statute now in question. It therefore follows that the liberty and natural rights of the individual are infringed by this statute unnecessarily and, consequently, unconstitutionally."

REPORT OF COMMITTEE ON APPLIED ARTS AND SCIENCES, A. I. A.

THE Committee on Applied Arts and Sciences was instructed "to consider on such questions as:" First, "how to overcome the unsatisfactory conditions due to the severance of the intimate relation once existing between architect and the craftsman;" second, "how to facilitate the delegation of design to craftsmen," and third, "how to secure some assistance to the architect in his work from the Arts and Crafts movement."

In order to know "how to overcome the unsatisfactory conditions due to" the cause above stated, it is quite necessary to understand the nature of the original conditions and the reasons underlying the changes which have led up to and still compel "the severance of that intimate relation once existing between architect and the craftsman." Even with a knowledge of the facts, power to do does not always follow desire to do, and to overcome or to know how to overcome the unsatisfactory conditions is not within the power of a single committee, a single body, or a single generation. A partial knowledge, however, may suggest mitigations where it cannot effect radical change. The intense apathy of the great public toward art, the general lack of knowledge or care as to what constitutes art or how art touches life, the utterly commonplace and devitalizing attitude on the part of public and designer, of seeking the line of least resistance, of harking back to something which is well known and can be recognized on the instant—all of this conspires against the elevating of art standards; and the architect, if he would, cannot rise above the general flood of wilful and self-satisfied stupefaction. It seems perfectly demonstrable that in the great periods of art everybody loved and appreciated beauty, whether actual producers thereof or not. The power to create and the capacity to appreciate beauty sprang from the conditions of life and inhered in all classes—at least the capacity for appreciation was general. The artists themselves, until the Renaissance, were drawn mainly from one class, and that not socially a high one. They were banded as brothers; their training was from within, and was developed by association; their minds were of about the same calibre, and mutual sympathy in thought and ideal made for the best. Class distinctions in art did not exist in the lofty periods as they do now. Even in our great democracy these distinctions are most clearly marked. The doers, that is, the craftsmen, are of the lower classes, the designers are a grade higher in the social scale, the architects are coming more and more from the cultured class, and unfortunately for art many of independent means are seeking the profession because the work is genteel. The art patrons, and they who may dictate the monu-

mental art of the world are of the moneyed aristocracy. The assumption of knowledge and the possession of power in the upper classes begets in the mind of the worker a dull subservience which does not make for art, and which on all counts is to be deplored. The general scheme of education is herein at fault, for it touches life but superficially, and gives to "educated persons" a mere smattering of the non-essentials of art, and to the workman a business knowledge, the sole end of which is its mintable quality. And life has not gained by that phase of modern education which devotes its energies to developing art-producers. Once art was *lived*, now it is *taught*. "Schools of art" have come to be considered necessary. But schools do not seem to have justified themselves, while they do seem in no small measure to justify the proverb—"When schools come in, art goes out."

An irrational system of general education, then, and closely drawn class-distinctions, especially in the field of art production, would seem to be marked factors in this severance of ties between architect and craftsman. Realizing the great advantage to the art worker in the old intimate conditions, many great and rare minds have advocated an advance beyond the unsocial and wholly irrational tendencies of modern life, to an ideal existence under State socialism, viewing the matter as one falling in the range of political economy. It would seem that in this they have not been wholly justified, for the great creative periods of art and those referred to, during which love and appreciation of art have been general, have occurred under varied forms of government and have been wholly independent of the nature of the governmental structure. The matter is largely one of social ethics, of mental development, and of social economics, and not at all of governmental forms. The socialism which shall bring joy in labor is not necessarily governmental, but it is greatly to be feared that the socialism which is governmental will operate to reduce humanity to one dead level of incentive, of capacity, of achievement, and, may be, of recompense, though that is of minor importance. The arbitrary apportionment of task which must almost of necessity accompany any system of State initiative and supervision of activities cannot otherwise than stunt personality and individuality. But this phase of socialism will hardly endure, for the annihilation of the distinctive functions of the various members can no more prevail in the body politic than it can in the individual, the body natural. For by nature and design (if we grant to the great universe a directing force) certain individuals, as certain members, are appointed—not condemned, but consecrated—to do certain work, and the pleasure and profit to the individual need not necessarily be in the work he performs, except as that work is necessary to the wholesome life of the body general. In other words, the feet are not to take upon themselves the work of the hands; the heart finds itself in deep and troubled waters when it takes upon itself the functions of the brain; the brain is incapable of doing the work of the heart. The effort of a new civilization should be, not to uproot individuality, not to smooth to a dead level the face of nature, the southern slope which catches the sun and the rugged eminence which shields it from the winds, but to make life tolerable where it has been intolerable, to make beauty bloom where no beauty has been, to minimize as far as possible the burden of irksome toil, and to make the general conditions of life productive of the higher happiness. Through education and bettered environment, the State may make the general life fruitful of sane enjoyment. A broader education, a wider sympathy, a deeper knowledge of the realities of life, a developed love of beauty in the mind of the race and a passionate zeal to express it, will reunite the sundered relation of intimacy which once existed between cre ›r, interpreter, and laity; that is, architect, craftsman, and public.

Until an advanced state of art endeavor and of art appreciation has been reached, the architect need not seriously concern himself with the matter of delegation of design to craftsmen. The question is, rather, how far shall the personal equation be allowed to enter in the interpretation of a sketch by the craftsman. No broad-minded architect shuts himself off from the suggestions of draughtsman or craftsman. But unless there be a singleness of thought and purpose in the minds of architect, assistant and interpreter, an understanding born of long seasons of sympathetic interchange of thought and idea, suggestions will tend rarely toward a unified expression. The wise architect will seek to have about him understanding and sympathetic assistants in all branches, but the architect need not seek to escape the travail of creation. Does the work bear down upon him? He must realize that beauty comes through stress, perfection through infinite pains, life comes even through death. The practical solution of the problem for to-day would seem, then, to be for the architect to bring himself as far as possible into the same relation with the craftsman that he holds with his assistant over the board and, failing that, should seek the craftsman whose work expresses a parallelism of idealism and motive, and, having found, employ that hand to execute the work and that mind to interpret the sketch.

The so-called Arts and Crafts movement, we must frankly realize, has not yet entered the stage in which it can be of much or of any assistance to the architect. The movement as such has not yet affected the great body of craftsmen. Artists and craftsmen connected with the movement have confined their thought and activity mainly to the design and execution of single and simple objects of use or beauty, such as pieces of furniture, household utensils and bits of decoration. In most of this production the amateur spirit is manifested, and not any of it bears upon the greater problem of architecture. Most of the artist-craftsmen have no intimate knowledge of architectural principles, which is to be regretted; and, too, they have had no architectural schooling, upon which they are to be congratulated, at least those of them to whom such schooling would mean the acquirement of an academic method and a frame of mind which expresses itself in the application of architectural details to the various simple objects, rather than in a lucid recognition of the limitation of materials and a frank adaptation of form to use. It is in the design and execution of stained glass for windows and ornamental metalwork and carvings which the arts-craftsmen are called upon occasionally to accomplish, that the want of appreciation of architectural and structural lines most manifests itself. Now and then arts-craftsmanship has undertaken to impress its spirit upon some modest example of cottage architecture, and has succeeded; but these are sporadic cases, and do not affect in any way the general tendencies. The architecture of the cottage, of the lesser house, of the villa, of the mansion, of the palace, is but a reflection of the greater architectural spirit, and until architects have learned to handle the greater architectural problems, and to solve them on their merits, without reference to conventions established in other climes, under other conditions, the lesser architecture will suffer from and express the same want of capacity for freshness of invention and directness of thought, the same inability to more than rehash old *motifs* which find expression in the greater and the monumental architecture of the day.

It were unjust to place upon the architect the entire blame, for blame there is, in all this abuse of tradition. It were better to attribute it in the large part to the lack of taste and of knowledge which exists because of the certain deficiencies in our civilization, the lack of correct methods in education which fosters the general ignorance of and indifference toward all forms of art. The germ of hope lies in the attitude of some of the lesser architects, and in the Arts and Crafts movement—not so much in what it has accomplished as in the spirit which animates it. The movement portends an awakening to art consciousness. But great and monumental architecture must be the expression of a deep, broad, spiritual life, and cannot be built up by accretions to any movement, however vital, sincere and wholesome it may be. The lesser architecture must, in the final expression, follow and reflect the greater. Yet even to-day, while in special instances the architect may enjoy the assistance of the individual artist-craftsman, architecture in general reaps no advantage from the Arts and Crafts movement.

Irving K. Pond, *Chairman.*

ILLUSTRATIONS

HOUSE OF F. H. GOODYEAR, ESQ., DELAWARE AVE., BUFFALO, N. Y. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

ROCHESTER STATE ARMORY, ROCHESTER, N. Y. MR. GEORGE L. HEINS, STATE ARCHITECT, ALBANY, N. Y.

As this armory is to be occupied by two separate military organizations and a division of the Naval Brigade, no specific title has been assigned to it.

BUFFALO GENERAL HOSPITAL, BUFFALO, N. Y. MR. GEORGE CARY, ARCHITECT, BUFFALO, N. Y.

NEW BUILDING OF THE NEW YORK HISTORICAL SOCIETY, CENTRAL PARK WEST, NEW YORK, N. Y. MESSRS. YORK & SAWYER, ARCHITECTS, NEW YORK, N. Y.

A very peculiar condition of affairs affects this building, already completed and essentially ready for occupancy. Some time ago, one of the oldest members of record of the Society, and at this moment a very aged and somewhat feeble gentleman, signified to his associates his desire to build for and present to the Society a new building, better arranged and more accessible than the one up to that time occupied by it at Second Avenue and Eleventh Street. The offer was, as was to be expected, accepted with expression of great gratitude, and the new building was accordingly built, but it still stands vacant. The directors have informed their benefactor that the Society finds itself unable to make use of the building, since its income would not suffice to keep the building warm and maintain it in the proper working condition.

BUILDING OF THE EASTMAN KODAK CO., CHICAGO, ILL. MESSRS. HILL & WOLTERSDORF, ARCHITECTS, CHICAGO, ILL.

The Eastman Kodak Company's building, erected on the northeast corner of Indiana Avenue and Eighteenth Street, in Chicago, is built in a very substantial manner, and according to the best type of heavy mill-construction, with two sections made absolutely fireproof. These sections contain the stairways, elevators, vaults and toilet-rooms, and are situated between the main east and west wings, and along the north side of the west wing. The stairways are of absolutely fireproof construction, built of reinforced-concrete steps, risers and curbs, with gas-pipe railings. The street and alley fronts are faced with a good quality of red pressed bricks with Bedford stone trimmings, and the ornamental parts are likewise in cut stone, carved from full-sized models, made from the design and under the supervision of the architects. The corner-store and offices in the upper stories are designated on the outside by plate-glass windows. The boiler and engine rooms under the north court are built fireproof. The entire building is equipped with automatic sprinklers.

Additional Illustrations in the International Edition.

ROOD AND CHAPEL SCREENS—PLATES 42-49.

The carved wooden screen in the church at Rigny-le-Ferron is an excellent example of many of the minor screens of this period. It is coarse and crude in workmanship, but has a spirit and character lacking in some of the later work.

At Chaource the ambition of the designer of the chapel screen surpassed his knowledge of detail of the new style, and we can observe faults of scale in the treatment of the pediment. As there is no particular merit in the execution, the example fails to arouse our interest.

In the Cathedral of Laon the chapels of the side aisle were formed in the XIIIth century by cutting down the sills of the aisle windows to the floor, and building a new outside wall and window on the extreme edge of the buttress. Whether this added chapel was enclosed before the time of the Henris, there is no record, but under Henri II. the chapels, the entire length of one side and nearly all of the opposite one, were enclosed. These screens were designed in the Doric order, with alternate arches and lintels over the entrance doors. The panels on either side of the entrance are filled half way up with a small arcade of free-standing columns, smaller reproductions of the main order, and in the treatment of the upper panel a bewildering variety of motives and details is used. The character of these screens lies herein, and one is at a loss to find in all Italy an inspiration for this peculiar form of decoration until the name of Cellini comes to mind. The penetrated stone panels are apparently but an enlargement of the goldsmith work of that artist.

Much the same character of work, adhering perhaps closer to the original, is found in the chapel screen in the Palais de Justice at Dijon. Here the principal columns are supported on consoles, and every architectural member is covered with decoration. The interwoven H and D in the upper part of the panel reveals this as the work of Henri II. The door of the chapel in the Chateau-d'Ancy-le-France is characteristic of the work of this period.

The choir enclosure in St. Remi, at Rheims, while classed as XVIth-century work by Nöel, is certainly of later date. The use of colored marble and the Rococo touches in the broken pediment and in the free cartouche are of much later date. The coat-of-arms and crown over the door have been destroyed. The wooden chapel screens at Fontainebleau by Louis XIII., and the colored marble screen at Cadillac, are commonplace in design, heavy in one instance and a mere piece of furniture in the other.

Of examples by Louis XVI. we have found no trace; the screen seems to have worked itself out, so to speak. As an illustration of the various styles of architecture, there is no single feature in which the influences in both detail and design is so clearly shown.

W. T. P.

NOTES AND CLIPPINGS

RED ROSE RENT IN PENNSYLVANIA.—A correspondent of the Boston *Transcript* writes: "The following account of a custom prevailing in certain parts of Pennsylvania I found in a Cincinnati paper. Can any one tell me where and when the 'red rose' tribute was first levied? Is it an English custom, and if so, how was it incorporated into the policy of the Lutheran Church? The public is generally conversant with the annual custom of paying 'one red rose' as ground rental by eastern Pennsylvania churches to the descendants of those who gave the ground for the edifices, but it is not generally known that hundreds of owners of farms are under a similar obligation.

"'Red rose rent' is yearly paid every second Sunday in June in the Lutheran church at Manheim, Lancaster county, in the Tulpehocken Reformed Church, about sixteen miles west of Reading, and in several edifices in Lebanon County, while several congregations in Berks are entitled to observe the event, but do not. Roses paid on these occasions to representatives of families whose ancestors made such provisions are treasured as priceless heirlooms, and at Manheim they have come from many States.

"It is known to few that more than 160 years ago great tracts of farm land were sold around Reading with the same stipulation. It is estimated that at least 20,000 acres of land in Berks are subject because of a clause in the original deeds to an annual ground-rent of one red rose. Records in the Berks court-house show that many years before Baron Stigel provided for the payment of red rose rent by the church at Manheim, Caspar Wistar sold land containing the same clause. Red rose rent is mentioned in connection with land in Tulpehocken, Marion, Maxatawny, Oley and other townships. It dates back to 1738. The Tulpehocken Reformed Church is built on land that is subject to 'one red rose' quit rent. The land was owned by Caspar Wistar, brass-button manufacturer, of Philadelphia. The red rose rent has been paid to the Philadelphia descendants of Caspar Wistar for some years. The most notable observance was in 1902, when thirty prominent Philadelphia Wistars attended the services and were paid 157 red roses in payment of arrears of rent.

"John Page, described as 'a gentleman from London,' was another extensive real estate speculator in the early Colonial period. He planned to establish a feudal barony along the Tulpehocken in 1735. Every deed of land sold by him contained the red rose clause."

EXPORTING ELECTRICITY.—For the first time on record, electricity appears as an article of import and export. The case has arisen between Italy and Switzerland, the Italian government conceding to that of Switzerland the privilege, on behalf of Stabio, a town in the Ticino Canton, of drawing electrical power for industrial and illuminating purposes from water supplies on Italian territory, and principally from the Vizzola torrent. The power will be distributed not only in the town of Stabio itself but in a wide district around. The amount of water rent to be paid to Italy is not stated.—*N. Y. Tribune.*

THE DELHI GATE AT FORT AGRA.—The Government of the United Provinces have sanctioned an estimate amounting to Rs. 39, 954 for restoring the inner Delhi Gate in the Fort at Agra. The work is, however, not likely to be taken in hand for some time yet as funds are not available at present.—*Indian Engineering.*

DEEP BRIDGE FOUNDATIONS NEAR NEW ORLEANS.—Borings one thousand feet deep in New Orleans have encountered nothing more solid than mud, sand and a little thin clay; hence the problem of making safe foundations for the piers of a gigantic railroad bridge which is soon to be built across the Mississippi, near that city, is a hard one for engineering science. The piers will rest on timber caissons, each measuring over 60 feet by 126 and 140 feet high. The bottoms of these caissons will be 170 feet below the surface of the river.—*Exchange.*

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IN our present consideration of the "competition evil," a discussion in which we are trying to emphasize, but not unfairly, the public's rights in the premises, we have reached a matter which deserves the most serious consideration and, we believe, the promptest action, if the body of the profession cares to preserve its present rights and opportunities. The statutory regulation of the procurement of designs for public buildings is a matter that deserves attention and general consideration as a matter of practical far more than as an academical matter of concern. The element that makes for practicality as well as imminence is the matter in which the tendency to appoint State Architects, County Architects, City Architects and, presently, Village Architects, is extending throughout the country, and we feel that a considerable portion of our readers will share our conviction that this tendency is deplorable, so far as good, practical results are desired, while it is vicious and mistaken so far as regards the welfare of the profession and the progress of architecture. Even if such officials were always and only to be drawn from the ranks of the exceptionally able members of the profession, we hardly feel as if we could approve the practice; but it is not needful to consider such an ideal possibility, for the busybodies and politicians who are active in creating official public architects are influenced mainly by the idea that an economy can be effected, and so attach to the office a salary that by its meagerness excludes the able architect and at the same time deprives the public of the service of its most competent members.

AT this moment a bill is before the Pennsylvania Legislature which provides for the appointment of a State Architect, who shall design and build all State buildings, shall have a term of office of four years and shall be paid $5,000 a year. Considering that Pennsylvania has just had an object-lesson in the shape of bills for architectural service on its new Capitol at the rate of about $130,000 per annum, it is not unreasonable that the taxpayers in that State should seek a means of effecting some economies in the cost of designing and superintending its public buildings. Although an appointment under the proposed law would certainly fall into the class of direct selection, we question whether the champions of that method will feel like citing it as exemplifying the working of the course they advocate. If legislatures feel obliged to make a place for some architect of indifferent ability, it should be enough to entrust him with the oversight and repair of existing buildings. It ought not to be difficult for the Philadelphia Chapter, A. I. A., to prove to the members of the Legislature that the designing of the State's public buildings deserve the attention of men having a higher monetary value than the man who can be content with a short term of service and $5,000 a year.

EVEN in States where, owing to conditions and the payment of larger salaries, the service has been secured of men of a higher grade than seems to be aimed at in Pennsylvania, the State Architect is of doubtful utility to the public, if we may draw an inference from the complaints about the New York State Architect which we have noted occurring in the daily papers from time to time. As Mr. Heins, whose acceptance of the office was a matter of surprise, is without doubt a man of ability and honesty, it is probable that some or all of these complainings were not justifiable, but their making none the less shows that some portion of the public feels that the architectural work of the State cannot be done efficiently, promptly and economically by a single public official, no matter how able or how adequately paid. At the present moment a very singular condition of affairs has developed in New York, if the details given in the New York *Times* are as stated, which at once illustrates an inherent weakness in the official architect method and proves that there is no preponderating value in the method of direct selection of an architect. It being naturally the duty of the New York State Architect to design the State's buildings, he has been for some time engaged with drawings for the State Normal College at Albany, but unfortunately has not been able to produce a design satisfactory to the Commissioner of Education, the law making the appropriation for the building vesting the approval of the design in the hands of the latter functionary, Mr. A. S. Draper, an intelligent and conscientious official, who has had a large experience in the building of educational buildings. Finding, after months of ineffective effort, that the public work was being wastefully delayed, the State Architect and the Commissioner at length agreed with satisfactory amicability that another architect should be asked to design the exterior treatment of the building. Mr. A. R. Ross of New

York was agreed on as the *deus ex machina* and he shortly produced a design which the Commissioner's committee "admires very much," but which the State Architect absolutely declines to accept. The deadlock has not been lifted, but has been so reinforced that the Commissioner is now seeking legislation which will authorize him to employ absolutely a private architect to design and superintend what seems to be an important building. If permission to employ private talent when official talent is found weak-kneed is to be sought and obtained, the character of public architecture may be kept at a satisfactory level; but of what real value is the official architect? The incident clearly shows, too, that the bringing into immediate contact at the outset of client and architect does not always produce the superlatively satisfactory result that is asserted by the champions of direct selection.

IF the statutory regulation of the designing of public buildings were to take the form of a general creation of official architects, we should withdraw our advocacy of such regulation; but as we think it far more likely to take the form of some competitive method, it seems worth while to consider the form, character and amount of restriction that should then be imposed. In the first place the courts would probably hold that the freedom of contract guaranteed by the Constitution would not be impaired by the most rigorous conditions that could be imposed by the public in dealing with its own property; so it would be proper to limit the competitors to those who could prove they possessed certain fixed qualifications, should be "licensed" even. And here it should be noted that the term of actual practice demanded as one qualification should be a minimum term. It might also be admissible to inflict a solid fine upon any unqualified person who should have the presumption to send in a design for a public building. This would save the "dignity" of those who do not like to compete with office-boys and would tend to minimize the work of the examining expert-adviser. The London County Council, following what it alleges to be an accepted custom, proposes to charge intending competitors £3 each for the programmes, letters of instruction, site diagrams, etc., in the new County Hall competition. Adopting and modifying this precedent, it might be desirable to exact a fee from each competitor for a public building, the fees going to meet the payment made to the expert adviser and the secondary prizes, and this, again, would tend to lighten the task of examination and selection.

THE statutes should declare, first, what buildings shall be built after competitive designs, and, second, what architects and from whence shall be allowed to compete for them. The first matter would have to be determined very largely on the basis of comparative cost, public buildings of insignificant cost being left still in the open field of private practice, where they can be made the subject of competition or not, as circumstances suggest. The second matter cannot arrange itself so automatically. Probably every one's first impulse would be to say, in the case of a given building, that, of course, the "local talent" must have its chance. But this by no means follows. The very genesis of the competitive method is found in the feeling the public has that, possibly, there is greater talent outside than there is at home. For this reason restriction of competition to the local talent of a city, a county or a State would be very unwise, as it would, for instance, leave Hoboken unable to profit by all the talent that practises in Manhattan. A better method would be to allow all properly qualified architects within a given radius from the selected site to compete, the radius being extended according as the magnitude, character and cost of the proposed building increases, cities on the seaboard being allowed to extend the radius on the landward side by as much as is lost to seaward.

A RATHER obvious matter is generally forgotten and left unprovided for. While architects make it plain that they want a certain percentage of the cost of the building paid to each of them for his competitive plans, no proper provision is made for the payment of their fellow-professional, the expert-adviser, and, although the promoter is told he must employ and pay such a person, no intimation is given to him as to the fee the expert-adviser is likely to require. The omission is unfortunate, and a line of conduct should be established clearly. A recent occurrence in England. where there is a rule which is more or less observed, shows the need of a stated and generally known line of procedure that should be followed in employing an expert-adviser: A certain school-board desiring to hold a limited competition for a small school-house costing only $4,500, the architects invited replied that they could compete only if an expert-adviser were employed, and intimated that the President of the R. I. B. A. would gladly nominate a proper person. The school-board willingly fell in with the suggestion, and the nomination was accordingly made, the name being sent in with the information that the expert's fee would be fifty guineas. Thereupon the school-board, who could not afford to pay the expert two-thirds as much as they expected to pay the successful architect, abandoned this competition altogether. It would seem that the laws of logic demand that, seeing that an expert-adviser is employed at the insistence of the competitors, his fee should be charged in some part against the prize-winners or the appointed architect, and not go in its entirety to magnify the outlay of the promoter.

AMERICAN architects used to be particularly fond of informing those connected with architectural periodicals that they "never read," that they only preserved a few plates and cast the balance of the publication into the waste-basket. Manners and customs in this respect have been sensibly modified, but even in former days we noticed that if by chance we happened to say anything that wounded a subscriber's *amour propre* we were sure to hear of it by return mail, being thus afforded proof that he, at least, was a reader. We feel very sure, therefore, that it is only due to the unfortunate fact that both Mr. A. Page Brown and Mr. James Brown Lord have passed over to the majority that we were not at once brought to book for assigning the authorship of the Appellate Court House in this city to Mr. Brown instead of to its real author, Mr. Lord, as we did in a list published a fortnight ago.

TWO RHODE ISLAND ARCHITECTS.

THE December meeting of the Rhode Island Chapter, A. I. A., was devoted to two memorial addresses dealing with the life work of two of its members recently deceased, and as these records bring the old and the new into such close contact, we feel that our readers may be glad to have them presented *in extenso*.

GEORGE WATERMAN CADY,[1] F. A. I. A.

WE are here to devote an evening to the memory of two of our professional brethren who, this last summer, left the works forever.

And, although they whom we commemorate were quite different, as men will differ, in all but their devotion to their profession, it is a happy circumstance which joins them thus in the minds of their fellow architects. For these two men represented, as none others in the Chapter did or could, the two opposite poles of the profession, the past and the future, the old traditional building of Rhode Island, based on construction and lonely technical study by candle-light, and the new American architecture, based on the finest academic training, on foreign travel, and on the largest observation.

Mr. Cady was the last of our self-trained architects. In doing honor to him, as we do on this evening, we do honor to a long line of men whom he, as the last, as one fallen on late times, still represented,—to William Carpenter, John Smith, the mason, Eliezer Whipple, the housewright, Caleb Ormsbee, John H. Greene, and James C. Bucklin.

It was a long and honorable career which closed on the ninth of August, 1906, when George Waterman Cady died at his home in Longmeadow. Born in Providence, August 27, 1825, he was the son of the Rev. Jonathan Cady and his wife, Eliza Pettey. His father was a prominent man in the town of that day,—pastor of the old Fountain Street Methodist Church, and of several other churches of that denomination.

Mr. Cady's education was begun in a private school in Providence—whose I cannot say—and was completed at the Lowell Seminary, in Massachusetts. We find him, after the close of his school days, as a clerk in a wholesale ship-chandlery. This sort of work was not to his taste, however. He had a mind and he meant to use it. He was naturally more of a maker or a doer of things than a trader. He turned to medicine and began studying, as the custom then was, with an established physician, a Dr. Waterman. This career was closed, however, by the tempest of the Dorr Rebellion which caused Mr. Cady's patron and instructor to flee to another State.

Left thus, without any occupation, Mr. Cady seems not to have sought any further instruction in medicine, though he never lost his interest in it. He at once apprenticed himself to Alexander Williams, a builder of Providence, who appears in the Directory of 1841, with a shop at 104 Broad Street. Plain carpenter work, however, he did not follow very long. When first "out of his time" with Williams—he bought the last six months from his master—he was called upon to build a hotel at Scio, New York, but when this was done he went to work for the Sweet brothers, stair-builders. Stair-building, under the impetus of the fashionable circular flights, had come to require more knowledge of drawing and of descriptive geometry than any other branch of the building craft. It led Mr. Cady, then, in the direction in which he naturally would go, and that the training was not lost, the designing and building, in 1860, of the Joseph Fletcher house, now the Lying-in Hospital, give evidence.

Mr. Cady, however, was not ready to give up the actual construction of buildings. He was still in the path of John Greene and of Bucklin in his earlier years. He purchased the shop and machinery of C. Young, on the corner of Charles and Smith Streets, about 1861, and when, a year or so later, this was burned, he built a shop on the present State House ground, on Gaspee Street. In 1869, he handed this shop over to his brother and son and launched out upon the future work of his life, the practice of architecture, not as a craft, but as a profession.

Mr. Cady began his new work with an office in a building next to the Universalist Church, on Westminster Street, where the Boston Store now stands. Here he designed and carried out the Burgess Building, just opposite, now 230 Westminster Street, a granite front characteristic of those days. Into this he moved his *atelier* and here he remained till, in 1882, he found quarters in the Barstow Building, on Weybosset Street, next to the building he had erected for Wm. H. Hall.

After the Barnaby fire, Mr. Cady was called in for the rebuilding, as the architect of the original structures. At this time he also built the Gaspee Building, in the place of the brownstone store so long associated with Henry T. Root. Into this Gaspee Building he moved his office, and here it remained till his death.

In his long life, and amid all his professional work, Mr. Cady found time for many other useful activities. He was much interested in military affairs, saw something of politics, and did excellent service as a fireman in the old days of the volunteers. But on that side of his life, however interesting and important, we have scarce time to dwell. It is as an architect that we do now honor him, and in his profession the amount of his achievement was great. The roll of his buildings is a long one. Beside those I have already named, he built the Fletcher Building, the Aldrich House, the High Street Bank, the building lately vacated by Bosworth & Aspinwall, the Infantry Armory, the State Armory at Woonsocket, the old Low's Opera House, the old station of The Three Ones, on Exchange Place, several churches in near-by towns, the Asbury Methodist Church, on North Main Street, his own church, and many school-houses and dwellings. He was, when he died, at almost 81, at work upon a building on Eddy Street.

Mr. Cady's career as an architect was marked and conditioned by the time in which he lived. He found himself in a day of transition. Beginning late in life—for he was forty-four when he finally launched upon the professional stream—with no preliminary office-training, to say nothing of the academic equipment now possible, with as a technical education solely that which he gained by practical work, and by his own hard study, with lithographs and engravings—often inaccurate to a degree we can hardly imagine—instead of photographs, he responded well to the demands made upon him. He came too late for the Colonial art tradition, nor did the Greek revival affect him. He was too early for the "great awakening" which began in the eighties. He had to take architecture as he found it, and that he did so well with the nondescript style, or negation of style, which was given into his hands to work with, speaks very much for his ability.

But an architect has other sides than the artistic. He is more or less of a craftsman. He must be, even in these days of the young Beaux-Arts men and the specialists, of the architectural engineer and the great contractor. In this field Mr. Cady's carpenter training stood him in good stead. For those days it was the best training, because the carpenters of that time dominated the whole building domain in Providence as surely as the *maestri di legname* did in Florence. It is otherwise now, but there is no one here who cannot remember something of that day.

The carpenter ancestry of Mr. Cady, which extended back for several generations, was also of no small help to him. It gave him a natural aptitude which could use what his own experience had placed at his command. It made him resourceful. It gave him the invaluable power of meeting promptly and effectively any occasion that might arise. No problem or emergency found him unprepared.

Again, the architect has to be a professional adviser—and no mean ability will serve his turn. And in this domain also Mr. Cady was not found wanting. No time has changed this requirement of the profession. None can, except to add to the burden thereof. It was essential to the man who built the pyramids, it was to the mediæval *magister operum*, it is to-day. In many ways it is the severest test that we can apply. Mr. Cady stood it.

Of this Chapter, Mr. Cady had been a member since January 5, 1876. In it he took a deep interest, serving on its committees and attending almost every meeting for years after his infirmity kept him from hearing what was going on. The Chapter may well speak of him as a stanch supporter and a pleasant comrade; it may well honor him as one who for forty years, in this community, had practised with skill, fidelity and honor the exacting art which is so dear to us.

[1]An address before the R. I. Chapter A. I. A., December 11, 1906, by Norman M. Isham, A. A. I. A.

EDMUND R. WILLSON[1]—1859-1906.

EDMUND R. WILLSON, the son of Rev. Edmund B. and Martha Anne (Buttrick) Willson (grand-daughter of Maj. John But-

[1]Address by Mr. Alfred Stone, F.A.I.A., before the R. I. Chapter, A. I. A., December 11, 1906.

trick, of the "Concord Fight"), was born April 21, 1856, at West Roxbury, Massachusetts, and died on the night of the 9th of September, 1906, at Petersham, Massachusetts, his father's native place.

Descended from the founders of New England, he inherited the instincts and the characteristics of the early settlers, and derived his love of good reading and fine literary taste from a cultured ancestry. His grandfather, as well as his father, was a minister and was settled not far from Providence, over the First Congregational Church, in Brooklyn, Connecticut, in 1813.

His own father entered Yale in 1834, but because of sickness was obliged to leave college in '35, and completed his studies in the Cambridge Divinity School, graduating in '43. He was ordained over the First Congregational Society of Grafton, Massachusetts, in '44; became pastor of the First Society in West Roxbury in '52, occupying the pulpit where Theodore Parker had preached, and was installed minister of the North Society in Salem in 1859, occupying that pulpit until the day of his death—June 13, 1895.

It will thus be seen that Mr. Edmund R. Willson was taken to Salem, the baby of the family, when he was but three years of age, so that that portion of his life within his memory, up to the time when, at fifteen, he entered Harvard University, was passed in Salem, where he imbibed the flavor, and was infused with the inspiration which still lingered in the old sea-port, although its Oriental commerce had almost completely gone to other and larger ports, and one could only see its richly-freighted ships through other eyes, and know of its adventures only from the tales of those who no longer trod the deck—survivors of the host of navigators who had sailed into all, or nearly all the ports in the world. Many in his father's parish were of the number—merchants, sea-captains, supercargoes, mates and sailors—and the wonderful collection at the East India Museum made by them and their predecessors, with no such purpose originally in view, supplied the material which now constitutes a unique and unparalleled ethnological and historic collection, and enables one to fill out and make real the word pictures with which, in those days, the youthful imagination was stimulated. This collection, open freely to all, was the constant resort of the youth in Salem.

Then, too, he was in daily contact with, and had the social entrée to the best of residences built in Colonial days, dating back to the very earliest settlement, and continuing well into the nineteenth century, covering a period of just about 200 years, thirty of which were after our separation from the Mother Country.

The silent influence of the traditions referred to, of these old houses and homes, and of the atmosphere of the quaint old town, can be distinctly traced in the chosen field of his activities.

As I have stated, he entered college a mere boy, at the age of fifteen. I have a photograph of him when he graduated from the High School the year he entered college, in short jacket, having the appearance of one about to enter the High School rather than college. It was to him, in some respects, a source of regret that he entered college so young, as in after years he felt that he was not old enough to have reaped that advantage which would have come to him had he been more mature. Perhaps he was right, but those of us who knew him best felt that it might have dulled the edge of that childlike simplicity and serenity, that buoyant and happy disposition, which was the charm of his life, and which instinctively drew everyone to him.

Of his boyhood life and the years which followed, down to the 13th of July, 1903, he has himself given a slight sketch in a sort of round-robin-letter, written by all the members of his High School class—that of 1871—in which each sets down for the edification of all the rest an outline of his own life.

I shall take the liberty to quote verbatim nearly all of what Mr. Willson wrote about himself:

For myself, after graduating and having our exercises in the hall at the top of the school-house on Flint Street (I know the street, but am in Salem so little that I'll not guarantee the name), and getting three volumes of Thackeray's "Miscellanies," and being mottoed "We live in deeds, not years"—which I doubt if I have lived up to, as I begin to feel more the weight of the years than pride in the deeds—I passed four years at Cambridge, graduating in '75, rooming for two years with Bert Flint [a high-school classmate], and neither distinguishing nor disgracing myself—never either being "on the rank-list" nor getting a "condition," simply pursuing that middle course which is said to be safest. Through with college I might, perhaps, have gone to teaching, if my college course had been more brilliant, and if I had looked older and more imposing. But as the schools, colleges, and seminaries did not jump for me, and having no bent, the inclination to a certain kind of drawing, which "Skiddy" Ropes always remembers with such a kind and exaggerated appreciation whenever we meet, suggested my going into the profession of architecture.

So for a year I was in the office of Peabody & Stearns, eminent architects in Boston; for nine months I took a special course in architecture at the Massachusetts Institute of Technology; then a year and a half with Sturgis & Brigham, in Boston; some four or five months with McKim, Mead & Bigelow in New York, and then in May, 1879—with a man who has been my dearest friend ever since—I went abroad, and stayed until December, 1881, studying architecture at the Ecole des Beaux-Arts, and travelling in France and Italy in the pursuit of my profession.

Coming home in the beginning of the year 1882, I went into the office of Stone & Carpenter and became a member of that firm the following year, and have been so since, and been occupied in placing on the soil of Providence and the rest of Rhode Island; some parts of the neighboring States of Massachusetts and Connecticut; Chicago and Buffalo in their Fair years, and possibly elsewhere, deeds, some of which I am glad are there and some of which I wish were not; the bother of it being that things built are there "for keeps," and can't be forgotten and wiped up as easily as some other things, except by fires and earthquakes, which fall impartially and imperturbably on the just and unjust. My good father gave me an excellent education for my profession, so that with ordinary go-as-you-please abilities I have been able to keep my head above water so far, and keep my wife and children from the poor-house, which I built for the State of Rhode Island some years ago, and the St. Elizabeth's Home and the St. Mary's Orphanage, to which I have also built additions in the past with an eye to the future.

December 14, 1882, I was married to Anne L. Frost, whom I had known in Salem, daughter of Mr. George W. Frost, of New Market, New Hampshire, and with our two children we live happily and modestly in a small house on the hill looking over the center of Providence, with an old-fashioned apple orchard as a buffer between us and our neighbors. * * *

I am forty-seven years, two months and twenty-two days old; five feet, four and a half inches high, and weigh one hundred and ninety-two pounds, though not unpleasantly fat, and feel (except occasionally) as if I was twenty-two or twenty-three years old, as I suppose all the rest of you do, or younger.

He questions why he selected architecture: perhaps his ministerial ancestry may account for it, for I have noticed that what seemed a disproportionally large number of architects are sons of ministers. I recall the two Wares—the professor and the editor, Robert S. Peabody, Robert D. Andrews, Thomas Hastings, John A. Fox, G. T. Tilden, A. J. Bloor, Lyman Silsbee, Wallis Howe, D. C. E. Loeb, and George W. Cady.

Mr. Willson's father I had known intimately for many years from seeing him in my own home, as he was an intimate friend of my father's, and between them there were many bonds of sympathy and harmonious views in matters of theology, religion and life, and from personal intimacy with him after he moved to Salem; and perhaps not unnaturally he wrote to me about the time of Edmund's return from abroad, expressing a desire that he should come to Providence and enter my office. I welcomed and encouraged his coming, and it did not take long to detect his ability and learn his worth. I was glad to know that he would like to be associated with Mr. Carpenter and myself, and very soon thereafter we entered into an agreement by which he became a partner, which partnership, like that of the marriage covenant, was not broken until death did us part.

His quickness of perception, his readiness with his pencil, his fertility in design, his infinite patience, his cheerful disposition, his almost utter inability to take offense, his readiness to abandon a design over which he had spent days of hard work in an endeavor to meet a client's whims or solve his difficulties, his entire freedom from counting the cost of his labor, he sometimes spending in design more than the cost of making the article—reckoning his time at a very moderate figure—were all characteristics of the high artistic standard which ruled his life.

His desire to solve every problem in the best possible manner, so far as lay in his power, sometimes led to delays in finishing drawings which were not always appreciated by clients who did not understand the value to them of deliberate study, of slow incubation, of consideration and reconsideration, of the necessity of uninterrupted cogitation, and the value of that unconscious cerebration which so frequently yet mysteriously follows prolonged contemplation.

No better illustration occurs to me of the value of deliberation in an artistic creation than St. Gaudens's immortal masterpiece, the Shaw Monument; and yet the people who had intrusted its creation to him would, in their impatience, if it had not been for a few men of cooler judgment and better appreciation, have

taken the commission from him and put it into other hands; so little do some understand that, notwithstanding what the Book of Genesis says, science has demonstrated the world was not made in seven days.

His method of work was not exactly unique, but it was unusual, except perhaps among those whose training is in accordance with Beaux-Arts' methods.

He was wonderfully quick and clever with his pencil, and would, through the medium of paper and pencil, express that which was passing through his mind while the design was in progress of development, as thought would follow thought and ideas step on each other's heels, as it were, as they sought expression in the sketches which he made, with an accompaniment of whistling or humming—almost singing. These sketches were turned out in rapid succession on tracing-paper with a soft, coarse pencil, folding fresh paper over a sketch which he had already made, making a new sketch on the fresh portion of the paper, and repeating the operation many times until he had satisfied himself, or until he had given full expression to the many phases which the problem assumed in its development. He would thus have before him many tentative solutions of the problem from which to work up his finished design.

While thoroughly versed in Classical architecture, and using it as the basis of much of his work, he was not a slavish adherent to the letter of its tenets. He was too exuberant, too much of a free-lance, had too subtile a sense of proportion and of adapting means to ends, and of designing so as to get the best possible expression of the material of which the structure was to be built, to confine himself too rigidly to precedent. He took just such liberties with the recognized rules of architecture as a poet takes with the rules of grammar. He did not violate them but enriched them, as his skill gave him the right.

It is not always easy to wholly disassociate his individual work from those working with him, but the design—meaning by that the architectural expression as distinct from pure construction and arrangement—of many buildings from the office was distinctly and unreservedly his.

Among the notable examples—the designs of which are distinctly his—are the Providence Public Library, the Scoville Library in Salisbury, Connecticut; the Petersham Public Library, and—though not so distinctly his as the others—the Whitney Memorial—Bolton Public Library.

The first—the Providence Public Library[1]—ranks as one of the best of modern library buildings of its size and cost in the country; correct in its proportions, dignified in its aspect, of equal interest and artistic expression on all four of its sides—a building, in which I venture to say, the stack is as worthy as the front, notwithstanding the dictum of such an authority as Russell Sturgis—that no one had ever successfully designed a stack-building.

The Scoville Library is built of a very light bluish gray—almost white—native limestone, rock-face ashlar of irregular sizes, no single stone of large size, and all laid with level beds and vertical joints. Its entrance is marked by a low tower with square top, the library and its stack occupying that portion of the building on the left of the entrance and in the rear, and a large public hall the wing on the right of the tower—a most attractive building, a reminder of old England, as it sits in quiet dignity on the green lawn among leafy trees, and it carries on the mantel over the fire-place a breast-plate in the shape of a piece of carved stone-work from the cathedral in the town after which the Connecticut town—Salisbury—is named.

The Petersham Library is but a portion of a memorial building, built of field stone of a more irregular and rounder character. It contains a memorial-hall and library; is more picturesque in its design and irregular in its outline than that at Salisbury, and it has done much to give a distinctive character to the small town on the hill, as the Barrington Town Hall, Library and High School[2] have given distinction to that town.

The Whitney Memorial Building[3] contains only the Bolton Public Library and an antiquarian room. It, too, is built of natural-face stone, but is unlike either of the other buildings in that the stones have a smoother face than those in the Barrington and Petersham buildings, are in larger pieces than in either building and are of granite formation. They are laid up irregularly but with an approximation to as nearly level beds as the stone will permit and with an effort to avoid the unrest and disturbance of the distressful so-called "pitch and dive" joints affected by some in laying-up natural-face work. The building has low walls and a red tile roof. The windows are large and set high, breaking in large dormers through the cornice into the roof on the sides and occupying a large space in two gables.

The entrance is through an open porch surmounted by a gable, the tympanum of which is plastered, with the seal of the town—a pine tree on a hillside beside an old brick powder-house—modelled in low relief and with artistic skill *in situ* by our own fellow-citizen and clever artist, Mr. Sidney R. Burleigh, who improved on the rendering of the official seal by sketching his subject from the powder-house itself which still perches on the hill-top overlooking the village.

These library buildings are each of them of more than usual merit, and in their adaptation to their respective sites, their environment and the peculiar requirements of each community show how successfully Mr. Willson solved each problem.

Not the least of their merit to my mind is that the four country libraries are each distinctly library buildings, yet are not of what may be called the Carnegie type—which, though well suited for large and important buildings, is not, I submit, so well adapted to small country libraries with rural surroundings which demand less formal and more picturesque treatment.

Of successful and original treatment of country estates, the group of buildings at Chapinville, Connecticut, for the Scoville family; those on Warwick Neck, R. I., for Senator Aldrich, and those for Mrs. Nevins at Methuen, Massachusetts, are examples which show careful study and successful solution of very unlike and complex problems.

The Warwick Neck group—comprising the "boat-house" with its central hall, its "great room" open on two sides to the water and so close to it that you feel, as you sit in it, that you are afloat on the deep; the "tea-house" with its one great room and huge fire-place, and minor rooms for the convenience of guests; the two stone "lodges"; the group of buildings around the "water-tower" — stable, automobile-garage, laundry, pump-house and office; the various farm buildings which have been so altered and brought into harmony with their surroundings that they would not be recoginzed as the buildings which were bought with the estate; and the great stone walls, enclosing the estate from the highways and the garden from the lawns, with their stately gateways, make, with their beautiful setting of broad undulating lawns, thick groves and single specimens of magnificent trees, a series of pictures and picturesque effects that can hardly be surpassed.

His untimely death prevented the completion of the work which was to have had its culmination in a residence, tentative sketches for which had been prepared, on a scale commensurate with and in keeping with the work already finished.

Whatever may be done hereafter, that which has been completed is a monument to his rare skill and felicitous treatment in dealing with a gentleman's estate, full of playful fancy, as befits the purposes of some of the buildings, yet stately and dignified as is proper for such a pretentious and regal estate.

The Scoville Estate on the southerly slope of the Berkshire Hills is less pretentious than that of Senator Aldrich, but like it is of large dimensions, and upon it a fine stone house has been built; an electric water-power plant; an automobile-garage; a boat-house of modest dimensions as compared with that of Senator Aldrich's; a round, brick water-tower with a conical tiled roof, of a decided Norman flavor; and a country school-house—all located in more or less picturesque spots or on broad lawns with rich foliage and fine shade trees; all indicative of the trend of American life and affording an opportunity for the architect to mould the taste and give fitting expression to the growing passion to seek relief from the bustle and stir of the great city in the quiet repose of rural surroundings. Not a repetition of that which took place in ancient Rome in its palmiest days, but a modern method of gratifying a like longing.

The work at Methuen was far less in volume than that at Warwick Neck or at Chapinville but no less successful and interesting, and of a kind in which Mr. Willson especially excelled, namely—the alteration and extension of an old farm house of the Colonial Period, making of it a spacious summer house, preserving its simplicity, making the new harmonize with the old, and at the same time adapting it to the modern ways of living of those who have leisure and wealth and demand comforts and even luxuries. This demand was met in part by building a most charmingly picturesque and effective tea-house entirely in harmony with the simple character of the old farm house.

Of simpler and more modest single houses for the homes of

[1] See "American Architect" for June 9 and Sept. 15, 1890.
[2] See "American Architect" for Sept. 17, 1887.
[3] See "American Architect" for March 10, 1906.

reasonably-well-to-do people there are many examples in Providence and elsewhere. I will only mention a few that we may recall some of the evidence of his handiwork. It is not my intention to describe them nor to characterize them, either to praise or criticise them, leaving that to each of you as you may have your own views of their intent and of their worth. My partial catalogue includes houses built for Miss Esther C. Baker; Mr. Geo. M. Smith; Mr. Robert W. Taft, on Hope Street; Mr. F. M. Sackett, on George Street; Mr. Rathbone Gardner; Mr. W. W. Dunnell, on Angell Street; Frederick Grinnell (now C. D. Owen's house), on Bowen Street; Edwin Burgess, on Prospect Street; and the Metcalf Mansion—containing the Pendleton Collection—on Benefit Street. This latter he designed *con amore* and spent upon it an inconceivable amount of time, study, discussion and thought, and he succeeded in producing as nearly as possible a perfect expression of the best domestic architecture of the first quarter of the nineteenth century. It may not be necessary for me to state to those who hear me that the house is not copied from any single example, but it has so often been stated that its interior finish is copied from the house occupied by Mr. Pendleton at the time of his decease and from which the furniture was taken to the house on Benefit Street that it seems worth while to correct the false impression. That house was built by Edward Dexter just at the close of the 18th century, on George Street, and was moved to its present location in 1859, I think, and is a good example of the best work of that day, but not, in all respects, as good as in some other houses of about the same date. It was, therefore, decided not to copy literally all of the interior of the Dexter house, but to reproduce the best work from many houses, making it a typical house of the period rather than a copy of any one house.

The Mansion is reversed in plan from the Dexter house. The rooms on the left of the hall in the Metcalf Mansion are on the right of the hall in the Dexter house, and the large room on the first floor in the N. W. corner—called the museum—occupies a corresponding place—but reversed—to that of the kitchen in the Dexter house.

The staircase, the doorways and the finish and mantels in the library and dining-room are copied from the Dexter house with slight changes only—principally in form of mouldings and details of ornamentation. The mantel in the drawing-room is a close copy of that in the Dexter house; that in the Museum is a copy of one from the Gov. Arnold House, No. 14 John Street, now occupied by the children of the late Arnold Green; that in the chamber over the Museum was the property of the School of Design and was, I think, taken from the John N. Mason house which formerly stood on Weybosset Street and was torn down in 1879 to make room for a two-story block, which latter building was torn down to make room for the six-story John H. Mason Building occupied by the O'Gorman Company.

The mantels in the dining-room chamber and library chamber were compositions made up from the study of a number of old examples. The object being, as before stated, to make a typical building fit to house consistently the beautiful furniture collected by Mr. Pendleton and left by him to the School of Design on condition that a substantially fireproof building be erected in which to keep it, the general design of which and the arrangement of the furniture having been agreed upon between him and Mr. Stephen O. Metcalf but a short time before Mr. Pendleton's decease.

It is to the generosity of Mr. Pendleton and Mr. Stephen O. Metcalf that the public and the city of Providence are indebted for this valuable collection and its fine depository and for the free opportunity to visit and examine them.

In the "Fleur de Lis,"[1] the joint production of Mr. Sidney R. Burleigh and Mr. Willson, we have a fine bit of mediævalism both in design and execution, and it has the rare distinction that its decorations in plaster, wood and iron were designed and executed by the artist himself and with such skill of execution that in sharpness and color it is almost as perfect as on the day it was executed.

The playful conversion of an old stable, a cheap tenement and a store-house on Garnet Street into an old German Hof Brau Haus was happily done, and the brick building two doors away from the Hof Brau Haus at the corner of Weybosset Street is a skilful adaptation of plan to an irregular and very meagre lot, with well designed and interesting exterior.

The group of City Buildings on Fountain Street has always seemed to me to be not only very attractive but the buildings are, while dignified and of unmistakably a public and municipal character, neither extravagant nor pretentious; the Lyman Gymnasium,[1] Pembroke Hall, and the Gymnasium for Women's College for Brown University, the latter in process of building when he died, are notable additions to the college groups.

[1]See "American Architect" for May 10, 1890.

Of business blocks, I will mention only a few, omitting those in which his individual work did not dominate the design:—on Westminster Street—the Lauderdale[2] and Francis Buildings, the Burrill Buildings, and the Wm. Wilkinson; and the Providence Telephone Company's Building[3] on Union Street. The changes in what was the "What Cheer" Building, originally designed by the father of Clifton Hall, virtually makes the front of the Providence Washington Building one of his designs; and the Providence Institution for Savings, also designed by Mr. Hall, is in its present form Mr. Willson's design. The changes in the old Union Bank Building and in the Butler Mansion make these fronts notable examples of preserving the flavor of the old architecture while adapting them to the requirements of the modern storekeeper. The Y. M. C. A. Building[4] in Providence; the addition to and alterations of the Old East India Museum, now the Peabody Academy, in Salem, Mass., may be added to the list which might be enlarged, but I will not take your time to enumerate more.

A member of his own family says of him:—

"That he was not a very distinguished scholar—not from want of ability or industry—but because he preferred to spend his time in browsing in the library and in other literary pursuits that seemed desultory, but which gave him a rather unusual knowledge of English Classics and a cultivated taste for literature in general. As to his interest in politics and the daily life of the whole country, his habitual reading of the New York *Sun*, his knowledge of the relationship of royal families, etc., your long acquaintance with him makes you more fit than I to speak."

I can add that his knowledge of families was not confined to royalty, but he took a keen delight in ferreting out relationships, not in the dry-as-dust manner of genealogists who lay the entire emphasis of their valuable research on the most minute detail. He traced in a broad way the lines of descent, the intermarriage of families, the effect of heredity, the complications of relationship, and the discovery of family ties often unknown and unsuspected by those possessing them. If, incidentally, I happened to mention a family and speak of their descent or connection with others, I became the recipient of a succession of questions till he had acquired all and more than all that I knew, because of the store of knowledge which he himself possessed. In this way he had acquired more knowledge of Rhode Island people and their family relationship than most Rhode Islanders. He also took great interest in heraldry and was an authority on heraldic devices, their meaning and their proper use.

Mr. Willson was an omnivorous reader, was thoroughly versed in the history of architecture, had a tenacious memory of the noted buildings of the world, and could quickly cite an example and turn to the book containing an illustration of that which he had in his mind.

An intimate friend, of literary tastes and a professional writer, with whom he played golf nearly every week, said of him to me that he knew more about more subjects than any man he ever met, a statement that I can fully endorse.

Before coming to Providence he began to make a collection of illustrations of such buildings as interested him or served to show how others had solved problems similar to those which every architect may possibly be called upon to solve in his own practice, and for that purpose he relied very much on the large number of architectural journals—American and foreign—for which he subscribed, and he took most of those published.

It was his habit to run rapidly through the reading matter, saving only such as seemed to him of especial interest and importance, tearing out carefully such illustrations as I have referred to, making himself so thoroughly familiar with them that he could remember that he had secured them, classifying them for his scrap-books into which he put them, and with his tenacious memory not forgetting what there was in each which he had selected for preservation and future reference.

These scrap-books were of his own design and unlike any I have ever seen. The leaves to which the illustrations were attached were put in so that they could be readily removed for use at the draughting-table or elsewhere, or for removal from one book to another should he wish to re-classify their contents,

[1]See "American Architect" for January 23, 1892.
[2]See "American Architect" for June 30, 1894.
[3]See "American Architect" for September 16, 1893.
[4]See "American Architect" for March 3, 1888.

both of which, with the growth of material, were of frequent recurrence. He had in this way collected one hundred and fifty-nine volumes, each holding about two hundred illustrations, and many in addition which were slipped between the leaves. Finding that his collection had outgrown his original system, he began to put the illustrations in stiff upright envelopes in drawers of the right size, properly and alphabetically arranged.

This collection was of great value to him in the study of his designs and was of service as a handy method of readily and graphically illustrating to his clients an idea which he wished to convey, or a suggestion of treatment which occurred to him. He scarcely ever used them to copy from, but they served to stimulate thought and afford inspiration, as good reading stimulates thought in the mind of a writer.

They ought to find their final abiding place in the School of Design, where they would be of invaluable service to the student of art and architecture in that institution; or in the Providence Athenæum or the Public Library, for reference and consultation in the art library of one or the other.

You will recall that Mr. Willson, in the sketch of his own life, says:—"In May, 1879, with a man who has been my dearest friend ever since, I went abroad and stayed till December, 1881; studying architecture at the École des Beaux-Arts and traveling in France and Italy in the pursuit of my profession." That friend—Mr. William E. Chamberlin, of Cambridge—though through physical infirmity confined to his own home, being unable to walk, is recognized as one of the most accomplished members of the profession; one who has under most discouraging circumstances achieved a large amount of work of distinguished merit, and has rendered invaluable service as adviser, counsellor and judge on matters architectural; an authority from whom none would think of taking an appeal. Mr. Chamberlin writes:—

"Edmund R. Willson was graduated from Harvard College in 1875, one of the youngest of his class, and began at once to study architecture. Those who knew him then will remember his extreme modesty, amounting almost to self-distrust, in the expression of his opinions. They will remember that before long they discovered that this self-effacing student's views were nearly always sound, and that he could adduce convincing facts to support them. His reading was wide and discriminating, and his mind was a storehouse of information which he knew how to use.

"After a course of study at the Massachusetts Institute of Technology, and service in architects' offices in Boston and New York, he went to Paris in June, 1879, and after six weeks of preparatory study he entered the Ecole des Beaux-Arts in July of that year. Here he spent two years and a half, doing the regular work of the school and interspersing his projects with many journeys in provincial France. By dint of constant reading he soon acquired an acquaintance, such as few possess, of the history of the architecture of France through all centuries and through all styles. Nothing escaped him; nothing failed to arouse his interest. As a student of architecture he found nothing unworthy of attention, and he approached everything in a broad and catholic spirit, though as an architect he had his likes and his preferences. He considered every architectural product of the past an historical record and, as such, sacred. This attitude of mind, especially rare among young men, who are prone to extreme views and strong prejudices, stamped him as a discriminating man, and won for him the confidence of his fellows, who always looked to him for cool judgment. In planning their travels his friends found him always informed, better than they, of what was worth doing. He was a good observer, but at first he was distrustful of his ability to make sketch-book record of what he saw—but he rapidly developed a facile pencil, and when he had finished his European sojourn he had a collection of notes and sketches—not simply pretty pictures—which formed an invaluable basis for his life's work. These diligent years bore fruit, as the fertile fancy of his subsequent work attests. Each problem of his professional life he met with scholarliness and lively imagination.

"He returned from Paris in December, 1881, and became the associate of Messrs. Stone & Carpenter, of Providence, just when we were awakening to the study of our own so-called Colonial architecture, and to this he brought his keen penetrative mind, seizing at once the essence of the various phases of the style, and reproducing its spirit as a faithful interpreter, not as an unthinking copyist. His professional life was a steady upward progress—a crescendo to the end.

"But all these professional attainments, high as they are, are small compared with the monument he built for himself in the hearts of his friends. Not only was his spirit gentle and generous, but there could be no ill-nature in his company. Strong in argument, though not eloquent, but skilled in a sort of fence peculiar to himself, his thrusts never hurt nor left a scar.

"To know him was to love him, and those who knew him longest loved him most.

"One of his French atelier-friends on hearing of his death writes: 'Ah! les bons souvenirs que j'ai de lui.' May we all leave so sweet a memory!"

Another of his fellow-students at the Beaux-Arts—Mr. A. W. Longfellow—writes:—

"I can only add a few words of affectionate remembrance of the wonderful cheerfulness and earnestness of our friend which accomplished so much.

"By his joy in living and sincere purpose, mingled with a rare sense of humor, he made work more interesting and play more fun for us all, though he never lost sight of others or of our purpose to make ourselves better architects. Indeed, he had the New England conscience, well developed, but well in hand. In the Institute and in Paris at the School he added to the 'gayety of nations' with his rare humor and quaint ways, but never forgot that for which we were striving.

"Everything he did was individual, but showed a deep sense of what was serious and beautiful in design, so that he gained not only the respect and admiration and love of all his comrades, but was as thoroughly appreciated by the Frenchman as by his compatriots. They had amusing stories about him and his little accidents, and he has ever been the joy of all our reunions since those happy days, and we have all rejoiced in the strong, beautiful work which he did, and the happy home life; the rewards of his sympathetic nature and well developed taste.

"His loss to us and to the profession is irreparable, but he has left behind the impress of a strong, joyous soul, earnestly striving for the happiness of others, and for the interest of his profession, which he accomplished. To such an extent has he impressed himself upon us that we shall ever feel his influence and help, and recall at every turn how he lightened the burden and set the pace.

"His generous criticism of others will always be a lesson to those who have worked with him, and we shall always feel that we still go on hand and hand with him, enjoying more and accomplishing more because we have known him and loved him."

His knowledge of architectural history was acquired in much the same way as his knowledge of men—by wide reading and personal enquiry. All of us will recall the quaint manner in which he would "quiz," debate and throw doubt upon the statements of another for the purpose of drawing from him his knowledge of the subject, and often for the purpose of testing the accuracy of his own information and to correct it when he himself was misinformed or was in doubt. It was this trait, I think, that Mr. Chamberlin had in mind when he speaks of "his skill in a sort of fence peculiar to himself, though his thrusts never hurt or left a scar."

This same spirit led him to enjoy testing his skill in solving problems and was a large factor in making him willing to enter competitions. The propriety and desirability of so doing has provoked much heated and often acrimonious discussion, has led to prolonged disputes, jealousies, bitter feeling, charges of unprofessional conduct, and attempts to overthrow awards because of their being unfair and partial. The question of competition has been the subject of much concern to the A. I. A. as well as to its several Chapters; attempts have been made to formulate into codes the principles which should govern their conduct, some contending that it should be declared to be unprofessional to enter any competition which was not limited and in which every competitor was not paid something—preferably enough to compensate each for the actual outlay for the office expenses, while others, by their practice, at least, have shown that they were ready to enter every competition which promised the slightest chance of success.

Mr. Willson did not take sides with either extreme, but he enjoyed the study of interesting and intricate problems in planning. He felt that there was much to gain in their study, that it was good for the office-force to have the practice, and he seemed to enjoy the challenge to measure his strength in contests with his fellows.

This led to his entering a number of competitions, the result being a percentage of success much above the average. The Y. M. C. A. Building; Lyman Gymnasium, Gymnasium for Women's College, Brown University; Providence Public Library, and Barrington Town-hall were won by competition, and in not one of these competitions, so far as I know, was there a complaint as to their conduct or a kick over the award. He never entered a competition where he had a pull, and no one could accuse him of entering one which was fixed to go his way. If not successful, he accepted defeat, not without disappointment, but never with resentment, and he could not be induced to join with other unsuccessful aspirants in an attempt to overthrow the decision unless convinced that there was collusion and unfair treatment. In fact, I do not recall a single instance where he joined in an attempt to overthrow a competition, except

one in which the twelve selected architects, from whose plans the expert advised that the Committee should select one for execution, all joined in an unsuccessful suit to prevent the appointment of a local architect whose plan was not only not selected, but was not even considered worthy of mention by the expert-adviser.

A good illustration of his attitude in such matters is shown in an extract from a letter which has been sent me by a friend, who was very anxious that Mr. Willson's plan should be selected in a competition. The plan which Mr. Willson submitted was commended and given a high rank, and though not placed first by the expert, was voted for by several on the Committee. An unsuccessful competitor who felt sure that he had such a pull that the job would surely come to him began in person, as soon as the expert made his report, and by the aid of the local newspaper and the help of correspondents of the Boston papers, to attempt to overthrow the decision of the expert and the Committee. This friend, who was not on the Committee, had written to Mr. Willson in regard to his plan, the travail of the competition, and of the attempts to overthrow the expert's award; to which Mr. Willson, as all of you would know he would, replied:—

"I am very much obliged to you for telling me some of the doings of the reporters, and what some of the other competitors had been doing in regard to bringing their sets of plans before the public and your suggestions thereto, but in all squareness there is nothing to do but to accept the judgment of the commission's adviser.

"I have no criticism to make in regard to the award, and think there is nothing for the committee to do in justice to everybody but to accept the opinion of their expert, who has presumably looked into all the plans and has a better expert knowledge; and as far as the opinion of 'nine out of ten' goes as to which is the best plan, I have no doubt that any competitor could select a group of his friends who would pass favorable judgment on his plan.

"In our case, it was certainly because we had the promise of Mr. Chandler or some equally able expert as a judge of the plans, and the payment of something for our time and labor, which induced us to go into the competition, as it was this condition which seemed to guarantee the competition, as far as could be, from the influence of pull—either political or friendly. And I think that any competitor who has gone into this competition on the basis of the prospectus as first sent forth, and which so far has been lived up to, has no right to make any sort of kick at the award, and I was rather sorry to see at the end of Prof. Chandler's report itself a generalization which seemed to imply that the commission might select any one of the first half-dozen or so. Of course, the whole thing is in the hands of the Committee, and the competitors so understood it, but the promise that the plans should be judged by a competent expert was made, and this had been done, and in all honor should be lived up to by all concerned. It could only be extraordinary reasons which would warrant the Commission in recommending any other plan than the one recommended by the expert. Such reasons, of course, there might be, but there are none apparent in this case, and I hope that you will not take it that anything which I have written (to you) in explanation of points of our scheme was with any idea of over-riding the recommendations of Mr. Chandler's report, and I hope that you will use your influence to prevent any tampering with the decision based upon it."

He was scrupulously assiduous to observe the ethics of the profession and to elevate the standard of professional conduct in its relations to client, contractor, material-men and fellow practitioners, making the Golden Rule his guide and generously lending a helping hand to any of his professional fellows.

COMMUNICATION

THE LAST OF THE REPLEVINED NEGATIVES.

To the Editors of the American Architect:

Dear Sirs:—Since you have given so much publicity to the recent unpleasant affair between one of my draughtsmen and myself, I think, considering the last comment you made, I should, in justice to myself, reply to same. What the draughtsman says in regard to being employed by me, and that one of the designs he worked on was accepted in a competition, is correct, and that he wished to have copies and photographs of the work is, no doubt, correct; but that he made these copies and photographs by my knowledge and consent and on his own time is not true, for he took the drawings from my office during working hours, and while I was out of the city, had them photographed, and immediately proceeded to show them to his friends and to the public, and it was only two or three days before he left that I was informed of this fact. Under ordinary circumstances, I should not object to any or all of my draughtsmen having photographs of the work in my office, and should hope to have them sufficiently interested in the work to want them. But, when they abuse their privileges, and take advantage of their employer in every possible way, it becomes, to say the least, not agreeable. I should probably not have objected to Mr. ——— keeping the photographs if some of them had not been of plans in a competition which had not been decided, and had I not thought it best to have all records in my possession and kept from the public until the decision was made. I demanded that Mr. ——— return the photographs and other drawings, which he refused to do in terms more forcible than elegant, and the only recourse I had was to fight, run or lay down. I decided not to do the last two, but am very sorry that I was compelled to take the course I did, though I think, under the circumstances, I did right, and should not hesitate to do so again, should I be so unfortunate as to be compelled to. Several drawings and sketches had disappeared from the office, but I was assured by Mr. ——— that he did not possess them, but had given them away to some of the other draughtsmen who had been in my employ, he assuming that, although he had been paid for the time consumed in making them, I had no right to them!

Hoping that this explanation will put the matter in a light that will not be misunderstood, I remain

Yours very truly,
J. W. Stevens.

ILLUSTRATIONS

ST. PAUL'S CHAPEL: COLUMBIA UNIVERSITY, NEW YORK, N. Y. MESSRS. HOWELLS & STOKES, ARCHITECTS, NEW YORK, N. Y.: SEVEN PLATES.

It is in some slight degree unfortunate that this building, dedicated to service last Sunday, so successfully handled as a composition and so satisfactorily treated on the interior so far as color and sensuous pleasurable effects go, comes so near to being an element detrimental to the general effect of the great group of collegiate buildings on Bloomingdale Heights; its scale and its proximity to the Library are no help to that building, while the relatively smaller amount of limestone finish used therein is rather out of color harmony with the other brick buildings of the group. But these things said, there is little else about the building that calls for anything but commendation.

Up to the time of dedication it was not generally known to whose generosity the University was indebted for the building, but it at that time was made known that the building is the gift of Miss Olivia Egleston Phelps Stokes and Miss Caroline Phelps Stokes, as a memorial to their father and mother, James Stokes and Caroline Phelps, and by the terms of the deed of gift is to be known as "St. Paul's Chapel of Columbia University, forever to be and remain a house set apart and dedicated to the service of Almighty God and of his Son, Jesus Christ, our Savior."

Exterior views of the building were published in our issues for June 30 and July 7 last.

The furnishings and fittings of the chapel are characterized by simplicity. The carving and tarsia work of the pulpit, reading-desks, choir-stalls, and organ-cases are the work of Coppede of Florence, one of the best-known wood-carvers of Italy, as the result of a competition organized by the architects in Italy, in which the three leading wood-carvers of that country, respectively active in Siena, Rome and Florence, took part. The style of the detail represents the best period of Italian wood-carving, about 1500. The chandeliers and openwork rail of the galleries are bronze, and the pavement's large and simple patterns are defined by inlaid bands of mosaic, consisting of fragments of old porphyry and serpentine brought from Italy.

The exterior materials are of brick and Indian limestone. The interior length is 120 feet, and the greatest width is 76 feet. The interior diameter of the dome is 48 feet, its interior height is 91 feet, and it supports a simple terra-cotta lantern of some eight tons weight. The cost of the structure complete has been about $260,000, exclusive of the stained glass, choir wood-carvings, and organ. The seating capacity is 1,050.

The chancel windows are executed by John La Farge. The present transept windows are temporary, but will be replaced by memorial windows.

The windows in the dome are memorials to well-known alumni of the institution, beginning with Philip Van Cortlandt, class of 1758, donor, to Robert B. Van Cortlandt, '82.

THE GRATWICK RESEARCH LABORATORY, BUFFALO, N. Y. MR. GEORGE CARY, ARCHITECT, BUFFALO, N. Y.

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IT is really a very curious coincidence that so shortly after we began to impress upon our readers the merits of the "compound' competition the Council of the Royal Institute of British Architects, arguing from premises known to themselves, should have recommended to the London County Council that the competition for the new County Hall should be given essentially the form of the compound competition. When this competition came up for discussion, January 12, on the notice of Mr. Woodward, he characterized it as a "most unusual course," and challenged "anybody to quote a precedent for it." It seems worth while to draw attention to the matter, as it shows that we have not been discussing a well-known practice, but that we, in America, and the Royal Institute of British Architects' Council, in England, have at about the same time perceived there was a possibility of taking a step in advance, and that there were good reasons for the general adoption of the method. In many ways the discussion at the meeting referred to was very revealing, and it was so thorough that it was more than merely typical of the ordinary discussion of the competition question. Thus, though the speakers professed to have the highest regard for the eight men who had been invited to take part in the final competition, they did not hesitate to say that they could not understand why these eight men should have been selected, and that many of them had given no evidence in their past work of any peculiar aptitude for the designing of a great municipal building. This was "nasty" enough, as our British cousins are fond of expressing themselves, but it was as nothing to the indecency with which it was hinted that there was no certainty that these eight men might not find a means of borrowing the ideas and so on lavished so profusely by those who took part in the first stage of the competition. This development of feeling, we think, shows very clearly that the rank and file of the profession, those, that is, with whom the voting strength lies, are not likely to favor the direct-selection method so much in favor with theorists on this side of the water just now. And this belief is reinforced by the discussion of another matter brought up at the same meeting, and which we think is worth while to reprint in part in another column.

IT seems to us that the discussion of the competition evil has always proceeded along mistaken lines. An infinity of intelligent discussion has been had both here and in England, but it has proceeded almost exclusively along theoretical lines, academical if you will, and attempts have been made to reach an abstract perfection which, of course, is unattainable. Now, the competition matter is an intensely human and practical question: it has to do with bread and butter and dollars; it is concerned with pride, ambition and self-esteem, and until the matter is considered mainly from its human aspect, the discussion of it is bound to be futile. The attempt at betterment has always proceeded from within, has been prompted by those who could perceive the theoretical excellences of other methods, but were not clear-sighted enough to understand that the practical obstacles in the way never could be overcome so. The profession has been entirely honest, both in its perception of the undesirability of existing methods and in its attempts to reform them, but it has not had and never can have full control over the human side of the problem; not, at least, until the profession is willing to sink to the level of a mere trade union. It is time now that an attempt should be made to accomplish from without the reforms that have been found beyond the reach of influences from within. There is an external influence that can accomplish the desired reforms and that power vests in the other party in interest, the public. In other words, there can be accomplished by the statutory regulation of competitions the greater part, if not all, of the desirable reforms that the profession has so long and so unavailingly been striving to bring about. It seems to us that if the Directors of the American Institute of Architects have the wisdom they should have, they will turn their attention seriously to the preparation of a series of regulations that they can recommend for adoption as a statute. We are convinced that the public very shortly will undertake to reform the matter from its own point of view, and it is better to guide it into desirable ways than suffer through avoidable blunders.

IT seems to us that, except in rare instances, of all methods that of direct selection may be the least likely to produce results of genuine worth. It seems to us that what happens is this: When an interesting programme

in open competition is announced, there are many who say to themselves: "Ah! this appeals to me. I've got an idea for just that sort of thing that I've long wanted an excuse for working out. I'll go in." The result is that the committee surely has submitted to it a certain number of genuine designs based on real ideas. When, secondly, the competition is limited, it may be held that the master impulse is to produce a design that shall overshadow those presented by the other competitors, whose style and methods are generally well known. Finally, in the case of direct selection, the controlling feeling is the determination to produce a result that is worthy of what the designer esteems his own reputation really to be, whether or no that result is the one that the conditions of the problem really indicate. In speaking with a friend the other day about the direct selection of architects, he pointed out that there was danger, if competition should be insisted on, that the public would be deprived of the service of those able men whose self-esteem would not allow them to take part in competitions, and he said: "What a shame it is that, in spite of the good accomplished by the Tarsney Act, the Government has never asked So-and-so to design a public building." So-and-so being a well-known leader. Now the fact is that So-and-so has done a building for the National Government, and it is only of very average merit, and moreover, the one important public building for a State that So-and-so has executed is distinctly commonplace. In other words, name and reputation are no sure guaranties of success.

AS the statutory regulation of the procurement of designs for public buildings along the lines we have suggested would result in a large increase in the number of competitions, and as, in conformity with the law, each must be conducted under the guidance of an expert-adviser, it follows that the importance of this functionary in the eyes of his fellow-professionals would be greatly magnified, and it would become of high importance to every one that the method of his appointment or selection should also be fixed by law. If left to the natural working out of unrelated competitions, it would probably be found that practically the same men, a small group, were desired as expert-advisers over and over again, and, whether these men should prove to be practising architects or the occupants of professorial chairs in the schools of architecture, it would certainly result that the demand upon their time as advisers in competitions would preclude them from the pursuit of their ordinary private avocations, and they would be forced to decide whether to become permanently and only expert-advisers, or whether they would actually stick to their first lasts. This probable result might as well be recognized at the outset, and, amongst other things fixed by statute, there might well be an official board of expert-advisers who, during a fixed term of service and over a stated radius of action, should devote their professional, judicial and discriminatory skill entirely to the conduct and determination of competitions for public buildings. In this way might be built up, under practical test, a very important "bureau" of the Department of Fine Arts which, some time or another, may be established at Washington.

AMONGST the "competition *evils*" there is none greater than the manner in which the expert-adviser is too often, if not always, treated by the competitors whose work is subjected to his examination. A few years ago the feeling was quite general that, owing to their independent position and their daily practice in criticising, valuing and assessing the comparative worth of work done in the school-room, the professors in the architectural schools were peculiarly adapted to fill the rôle of expert-adviser with indisputable satisfactoriness. But, alas, it was presently found that these professors had an awkward trick of discovering "unknown talent," in a way that was exceedingly displeasing to the leaders of the profession, who found their best efforts outclassed again and again, and so, the slogan was sounded that none but a practising architect was competent to value the merits of a truly modern building. The satisfaction that can be dealt out by practical men of the stamp lately demanded by the profession was pretty clearly demonstrated, recently, by the Peace Palace competition, where all of the six professional jurors had been practising architects, and all but one were still engaged in active practice of the most important kind. Yet never has a decision been received with less satisfaction by the disappointed competitors. If neither the professors nor the practising architects can infallibly give satisfaction, perhaps an official board of examiners might be more successful: at least, those architects who desire to be licensed by examining boards should find themselves barred from voicing a protest against the decision of a similar official board established by statute. The belief is, of course, quite foundationless, for only the winner and the public are satisfied with any given competition.

WE have been giving considerable space of late to the discussion of the competition matter, because it seems to us that it's in "in the air" and impending, and it is rather a disappointment to find that the views we have advanced with some little definiteness have extorted from our readers so little in the way of commendation or condemnation. Before dropping the matter for the present, we will recapitulate here the points we have been endeavoring to make in the matter of designs for public buildings. First, the interests of the public are paramount. Second, these paramount interests of the public can be satisfied with the nearest approach to certainty through the agency of the compound competition. Third, that the procurement of designs for public buildings through the agency of the compound competition should be regulated by public statute having universal application. Fourth, that adjudication on designs so submitted should be made in conformity with the advice of an official body of expert-advisers. Finally, our purpose has been to show how to put an end, so far as possible, to the greatest of the competition evils, the unseemly complainings, revilings and denunciations of competitors who are encouraged to vent their spleen mainly because, the status of the competition not being recognized as fixed and immutable, they hope to accomplish next time and in another way what they have just failed in effecting.

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February 16, 1907.

OPEN *VS.* RESTRICTED COMPETITIONS.

IN its issue for January 18, the editor of *The Building News* declares that when Mr. Gammell recently brought forward a resolution[1] at the R.I.B.A., advocating that all competition for public buildings erected by public money should be thrown open to the profession at large, he and the large number of young men present hardly recognized that there was another side to the question. They have passed their resolution, certainly; but whether it is going to have any great practical effect remains to be seen.

When the contemplated building is one of great magnitude or importance, unquestionably the right thing is an open competition. The promoters desire the very best design possible, and recognize that this is the only means by which it can be obtained, while they are willing to put up with the delay, inconvenience and trouble which the holding of an open competition entails. For there is a large amount of trouble involved, and of expense also, not merely in the payment of the assessor's fees, but in arranging for an exhibition of the drawings and for a large amount of clerical and official labor. Architects, too, are justified in entering, for the proportionate cost of preparing the preliminary sketches is not great as compared with the premiums offered and the percentage which accrues to the successful man, to say nothing of the prestige gained amongst his professional brethren and the consequent prospects of future work. When the building is small, however, all these considerations are reversed. A large corporation about to erect a building to cost, say, £100,000, is willing to spend a few hundreds in the expenses of a competition; but these expenses are not greatly reduced if the building itself is one which will not involve an expenditure of more than a twentieth of that sum. The proportion tells against the promoters. It is the same with regard to time —often a matter of quite as much importance as money. Six months is not an unreasonable period to spend in selecting the best scheme for a building which will take five years to erect, but it is out of all reasonable proportion to the nine or twelve months which should suffice for a small one, and no open competition can be carried through in less. Still, there are public bodies of lesser magnitude who are rather proud of the position which an open competition places them in, and if encouraged will initiate such in order to enjoy the position of prominence into which it brings them, for the sense of self-importance is very strong indeed amongst local politicians. Financially, the ratepayers are burdened, and the building delayed; but that is a small matter to the actual promoters. The competition is advertised, and the building being a simple one, the number of competitors is unduly large. Each individual set of drawings may not cost much; but it has been demonstrated on many an occasion that the total cost to their authors has been more than sufficient to erect the building. What, then, is the advantage to the profession, as a whole, of holding an open competition under such circumstances? That architects were losers and not gainers by the system where small work was concerned was recognized many years ago, and in order to meet the case a system of restricted or limited competitions has grown up, to which the younger men now object. The spirit in which they are taking it is not so much that of the sportsman as of the gambler, who, pitted against the bank-holder, knows that although he may by some chance win a fortune himself, there is an absolute certainty that the bank will win in the long run, and that the gamesters as a body will lose. The present movement is a reaction, due to the principle of restriction having of late years been extended, beyond reason, to include several competitions for large and important buildings where a general invitation would have been preferable, and to a feeling which, though unexpressed save in a few instances, has yet become very marked, that a ring is being formed of a certain few men, who are invited to participate again and again while the members of the rank and file, unknown but frequently of considerable capacity, are not being given a fair chnace.

Now there are two ways in which restriction is possible. One is for the promoters, with or without the advice of a previously appointed assessor, to select a certain number of architects to compete, paying each one of these a small fee for the preparation of his drawings, and placing the work in the hands of him who, in the opinion of the assessor, produces the most satisfactory scheme. This is the course which is generally adopted by public bodies round about London, and by those who have instituted limited competitions for buildings of any magnitude. Sometimes all architects are invited by advertisement in the first instance to apply for admission to compete, stating that they are willing to do so, and setting forth what buildings of a similar nature to the one now contemplated they have hitherto carried out or been engaged upon. This enables the promoters to select only men of experience, from whom satisfactory schemes may be expected. From the promoters' point of view, it is one of the best methods possible of securing what they want at a reasonable expenditure of time and money; but it is naturally not so satisfactory to the young and unknown man. He generally wishes to enter for anything and everything, whether his knowledge is such as to justify him in doing so or not. For works of moderate size, however, a competition conducted on these lines has a very great deal to recommend it. It saves time, money, and temper upon the part both of promoters and of competitors.

A second method of restricting competitions, often employed in the provinces, is that of advertising them as being open only to architects practising within a certain radius of the place where the building is to be erected. When the matter was discussed at the Institute recently, there were very few provincial men present; otherwise, the advantages of local restriction such as this would have been much more forcibly put forward than was the case. The architects in outlying provincial districts used at one time to complain that all important work went to London men, and it has been due to the representations of provincial societies that the system of local competitions has become one of considerable adoption. The men in, say, the Newcastle district see no more reason why a large technical school to be erected there should be designed and carried out by a South-country architect than does the average London man why a German or a Frenchman should erect the new County Hall. The provincial and local instinct is very strong, and, as a general rule, it may be admitted that the results in the past have justified restriction in this way when the works have been of other than first-class importance. Taking the whole country over, each man in turn obtains his opportunity, and when it occurs he has a better chance of success, owing to the comparatively small number of schemes submitted, than he would have if the competition were open to all.

The Institute may pass resolutions in any number, but it is impossible to overcome the arguments which we have stated above when they are brought before a body of level-headed town councillors or guardians, while the younger architects themselves would be the very first to cry out, if open competitions became customary for every little parish-hall or local school, without restriction as to locality or experience, with the result that hundreds of designs would be submitted in each case. Fortunately, the matter is not in the hands of architects entirely, for, although their representations may have some weight, yet, on the whole, the restricted-competition system has worked so well that it is not likely to be abandoned by those who have hitherto adopted it with success. Promoters have, in fact, found limited competitions so satisfactory that they prefer them even in the case of large buildings, though the arguments in their favor are then by no means so strong. The very magnitude and complexity of the work itself acts in a restrictive manner, reducing the number of competitors within reason.

While we acknowledge that the profession of architecture is particularly favorable to the capable man through the possibilities which competitions offer, we should greatly regret to see the whole body of the younger practising architects in the country converted into mere speculative gamblers, losing, as a body and with their eyes open, large sums of money in order that a few might here and there secure the privilege of doing a small piece of work, on what, after all, is little more than a living wage for it.

[1]See the resolution and discussion elsewhere in this issue.

LIMITED COMPETITIONS FOR PUBLIC BUILDINGS.

AT the meeting of the Royal Institute of British Architects held on January 12 last, Mr. K. Gammell [*A.*], in accordance with notice, brought forward the following resolutions:

"That in view of the fact that Limited Competitions for public buildings erected with public moneys are a great injustice to the young and unknown members of the profession struggling for recognition, and also not in the best interests of the promoters, this Institute declares that such Competitions should not be limited, and should take such steps as may be deemed advisable to discourage Public Bodies from instituting such Competitions."

"That this Institute exert its influence in obtaining the abolition of the growing custom of penalizing non-competing architects by retaining their deposit."

Mr. Gammell having been called upon by the chairman said: May I be permitted to say, without desiring to give any offence whatever, that I have not come here this evening to make pleasant speeches. I have come here to fight against what I, rightly or wrongly, imagine to be an injustice, but I hope to fight fairly and squarely.

In opening my remarks this evening I am premising that every member present in this room is fully conversant with the purpose of the motions standing in my name. I want it to be clearly understood by every member present that I have, from the very beginning, set my face against any form of procedure that can be directly or indirectly attributed to a faction or sect. I have solicited no member's presence here to-night, but have left it to his individual judgment to attend, if such be thought desirable. On the last occasion, recognizing that with another motion down for consideration, and Mr. Waterhouse's paper for further discussion, time for explanation must be very limited, I entered this room with a scheme for putting my case, which I flattered myself was the last word on brevity. Well, I did my best, and the result was the production of an explanation which took on the character of a drawing combining plans, elevations, sections, details and perspectives on one single sheet. To-night, I propose to submit for your consideration what I would call the specification, that is to say, to add those points which the combination drawing did not, to my mind, sufficiently explain. I propose to anticipate the possible arguments against my case. The order in which they are given must not be taken as indicative of any greater value of one than another. First, I take the argument that, I believe, was advanced by Sir Aston Webb, and which, unless I am mistaken, was to the effect that he would not have young men go in for too many competitions, as they did not pay. I am quite in agreement as to the fact of their not paying, but where I fancy a difference of opinion may exist is in respect to the particular persons out of pocket. On some occasions I can call to mind, a young and unknown man has managed in some wonderful way to win a competition over the heads of much older men, and then, of course, it is not paying for the latter. Then another objection offered is, that if promoters felt that the Institute approved of unlimited competitions, they would feel disposed to have no competition at all, but merely give the work to one man. To this I first answer, Would they? That is only capable of proof by actual experience, which, of course, is at present non-existent. Second, I would say that if this were to be so (which I do not for a moment accept as what would really occur), then, to me, it would savor far more of justice than the present compromise, which is neither fish, flesh, fowl, nor good red herring. Next I will take the argument (advanced by a correspondent) that eminent men (specialists, as he terms them) will not compete. Why? As derogatory to their dignity? If they are specialists, then it seems to my limited intelligence that they ought to make short work of their non-specialist opponents. If not, their claim to be above their fellows is a myth. As being *à propos* and topical of this question, I would ask, What called forth the original building of the Stadium at Athens, and also its recent restoration by a Greek gentleman? The answer comes, the Olympian games. Will anyone in this room maintain that such world-wide interest as accrued, or such huge crowds, or such honor, would have attended games where the best men refused to compete openly, as being derogatory to their position and attainments? Again, would the same value in the architectural mind the world over attach itself to the reputation of the late Charles Garnier had he won the competition for the Paris Opera House in a limited competition of, say, six architects? Mr. E. T. Hall, when speaking about this motion on 11th June said as follows: "Known men, who were very busy, sometimes did not see their way to go in for competitions, and he was sure the public would not say this proposal was in their interest if, as a result, the busy men refrained from entering these competitions: the more open they were the better. It was not, however, always practicable, and he thought there should be grave pause before such a resolution was passed." As to the contention in the first part of this quotation, surely Mr. Hall's sense of justice will subscribe to the old proverb that enough is as good as a feast. In other words, I hope Mr. Hall will not consider my remark offensive if I contend that his argument, to me, savors of the dog-in-the-manger principle. As to the latter part of the quotation I may be wrong, but I have a shrewd suspicion that in pleading for a "grave" pause Mr. Hall was not without hope of the matter being "permanently buried." Another argument raised against the motion concerns the enormous waste of time and effort to what must necessarily be a very great majority of the competitors. To answer this I contend that there is "eventually" no waste, for I regard effort expended in competition work in precisely the same light as the medical students' walking the hospital, and I do not think that anyone in this room will contend that the public are anything but the better off for the voluntary undertaking. Is anyone prepared to maintain that the first library, school, town-hall, etc., won by an architect who has been going in for such competition work, is not infinitely benefited and the public convenience better served in consequence of the time and study he has had to give in competing for this class of work? One very good purpose which unlimited competitions serve is to bring to the notice of those in authority the tremendous competition that exists, and this, I think, cannot fail to have anything but a good result. I think it would be a splendid thing for this profession, if a messenger from Mars could visit some of the more fortunate members of it, in the same manner as he did the gentleman in Mr. Robert Ganthony's amusing play. Before taking the next objection I would point out that the entrance for competition is not compulsory. I do not think that the list would be complete unless I included as a possible objection the uselessness of competitions to produce the best designs. The answer to this would seem to me to be all or none—beyond this I do not think further answer is required. Another argument offered is that if the resolution be passed, public bodies may say that they will have no competition at all, but merely give it to the county or borough surveyor. Now I have no wish to run my head against a brick wall, but I may say that, while prepared to admit the possibility of this contention, I cannot admit the probability. To my mind the planning of buildings, such as hospitals, free libraries and municipal buildings is now so generally recognized as a matter calling for great skill and ability that I do not think, for one moment, that such a state of affairs as suggested would be tolerated by the public, who in these commercial days seem quite set upon getting the best articles for their outlay. I may be wrong, but I hold the belief that what calls forth the building of a new town-hall or some such building lies, not so much in the fact that the existing building is impossible, but, metaphorically speaking, as that "that chap Stockport or Walsall next door is taking the shine out of us, and we aren't going to stand that, oh dear no! They had the lower part of their building constructed in granite. We will have an entire granite front, that we will, and bother the ratepayers!" One gentleman says there is nothing professionally wrong in taking part in a limited competition, and it is not practical politics to try to prevent one from doing so. I quite agree with this contention so long as the building does not fall within the class I have indicated in the resolution, namely, public buildings. If he, however, means to include this class in his criticism, then I combat the statement that it is not practical politics. Another gentleman said to me that he did not think much good would accrue if the motions were carried; but I disagree with him, insomuch as to hold the belief that public bodies are very like sheep, and mostly follow a leader or an example, and this is one of the reasons I have in wishing to see the Institute placed in a position to pioneer an action which I think will one day prove distinctly advantageous to both the profession and the public. These are the possible objections so far as I have been able to anticipate. I quite recognize that there may be others, and shall be very glad to hear them, and, if possible, answer or refute them. In conclusion I have to say as follows to that particular body of gentlemen whom I would like to see registered as "Architecture & Co., Ltd.": May it please your Exclusivenesses. The younger generation are knocking at your door. They are hungry. Have you the heart to keep them out? Gentlemen, I look and hope but for one answer, and whether it comes to-night or at some distant date, I cannot foretell, but I feel that it must come. That concludes my specification, and were I to go on talking, as I might easily do, I should lay myself open to the charge which a certain French writer brought against another of continuing to talk long after he had anything to say.

After a prolonged discussion the resolutions were adopted.

THE TEMPLE LIBRARY OF NIPPUR.

PROFESSOR HERMAN V. HILPRECHT, the Assyriologist of the University of Pennsylvania, in the preface of Volume xx of his "*The Babylonian Expeditions of the University of Pennsylvania,*" which has just been published, for the

first time explains his reasons for keeping secret all information as to the contents of the Temple Library of Nippur, which caused criticism in university circles two years ago, and ended with an official investigation of Dr. Hilprecht's discoveries and his justification at the hands of the University trustees. He gives as reason for his silence that the perishable condition of the unbaked clay tablets has made it impossible for him to examine, classify, and translate them as should be done.

Dr. Hilprecht, when asked by the New York *Evening Post* if the preface of his book is meant to be a reply to his many critics, replied:

"No, no! Emphatically no! I have written from a purely scientific standpoint. I would not deign to notice the criticisms appearing in the newspapers. How could I? I do not know who my critics are. All that I have to say is in the book. I write plainly. All can understand."

The preface to Dr. Hilprecht's book is in part as follows:

The cuneiform texts here published form a very small part of a large collection of tablets and fragments once constituting the Temple Library of Nippur. In order not to allow of any doubt as to the real meaning of my words, I emphatically state once more, I do not mean the Temple Archive, or the Temple School, or anything else but the Temple Library of Nippur. Enough of the crude and unsolicited advice received during the last two years in signed and unsigned American newspaper articles, journals, etc., as to what should constitute an old Babylonian temple library, and what I should call the epoch-making discoveries of the University of Pennsylvania's expeditions to Nippur. I must resent it the more, as I happen to be the only Assyriologist who (however hastily in many cases) has examined all the—more than 50,000—cuneiform inscriptions thus far excavated there, and who from its inception to the present day has been connected with this great scientific undertaking. What a Babylonian temple library looks like, according to the facts furnished by the spade, and not according to more or less confused theories, I have attempted to set forth in Chapter I of Vol. XIX, Part 1: *Model Texts and Exercises from the Temple School of Nippur*. This chapter was written to form part of the present book; but finding that the new mathematical and chronological tablets here edited required a fuller discussion than originally planned, I was obliged to reserve it for the next volume, in which the Temple School and Temple Archive are treated in their relation to the Temple Library.

It is a very natural desire on the part of scholars to see published as early as possible what is left of the scientific and literary activity at the oldest and most renowned Babylonian sanctuary and seat of learning. At the same time, it is not my nor any one's fault that the various results of our excavations could not have been submitted more rapidly to Assyriologists. All the members of the Babylonian Section of the University of Pennsylvania are taxed to the utmost with constant work on the material to appear in our expedition series. At the best a cuneiform volume is no novel which may be written from day to day. Before the rather pleasant task of "bookmaking" can begin, the numerous fragments preserved in two museums, separated by more than 5,000 miles, must be cleaned, minutely examined, catalogued, divided into groups and subdivisions, and as far as possible joined to other pieces of the same tablet (often excavated at different times by different expeditions), that the scholar intrusted with the editing of a volume may receive his material properly prepared.

Peculiar circumstances arose which made my task even more exasperating. Toward the end of May, 1900, the antiquities excavated by the fourth expedition and packed at Hilla under Haynes's personal supervision, were sealed and delivered to the representatives of the Ottoman Government at that place for shipment to Constantinople. The way around Arabia is long; numerous delays were unavoidable, and frequent transfers of the precious material necessary. The boxes were often exposed to the inclemencies of the weather and roughly handled by inexperienced native workmen. Their Excellencies Hamdy and Halil Bey (to whom again I express my warmest appreciation of their continued interest and loyal support of our work) did everything in their power to secure the early arrival of the antiquities at the Imperial Museum; but more than a year elapsed before they were landed at their place of destination.

In 1901 I went twice to Constantinople, personally unpacking, examining, and repacking more than 20,000 inscribed tablets and fragments within four months. A large portion of the Temple Library was presented by His Majesty the Sultan to the writer for his past services in connection with the organization of the Imperial Ottoman Museum. It happened that large masses of antiquities from other excavations arrived in Constantinople that very year, while the magnificent third building of the Sultan's museum was still in course of construction. It was impossible to provide proper storage for all the boxes in the spacious cellars and vaults at the disposal of the authorities. Wooden sheds had to be erected in the courtyard of the museum, to give temporary shelter to whatsoever could not find a place behind stone walls. The fall and winter rains of 1901 to 1902 were extremely severe, and these sheds proved a very insufficient protection for our own antiquities. Thoroughly wet and partly rotting, the boxes given to the writer arrived in Philadelphia in the summer of 1902 when he was absent in Germany.

Upon my return to Philadelphia, end of September, 1902, the antiquities received were presented to the Board of Trustees of the University of Pennsylvania, and a series of public lectures delivered, in which for the first time a summary of the history and scientific results achieved by all the Babylonian expeditions of the University were submitted to the numerous friends and supporters of this great undertaking. At my earliest opportunity I also opened some of the boxes from Constantinople. They were still so wet that their contents of unbaked inscribed clay threatened to be lost to science forever. Energetic measures were necessary to save the broken remains of the Temple Library, destroyed by the Elamites, and 4,000 years later brought to light again by so much personal sacrifice on the part of the committee and the members of the expedition. Accordingly, strict orders were given not to move or touch any of the tablet boxes (stored in a moderately heated large room of the museum), until the writer was satisfied that their contents had become hard enough to be handled with safety.

About two and a half months after my arrival I had to leave Philadelphia again (December 16, 1902) for Constantinople, where I spent over five months in 1903 (February and March, September to December) in cataloguing cuneiform texts, and assisting in the arranging of antiquities for the opening of the new museum building. On December 24, 1903, I was back in Philadelphia, examining at once into the condition of the tablets left wet and soft in the previous year. Having convinced myself that the antiquities had been saved by the precaution taken, I commenced to catalogue the large number of tablets remaining from the previous expeditions; for until the present new Archæological Museum of the University had been opened (end of 1899, when the writer was en-route for Babylonia), there was no suitable place for cataloguing and storing the thousands of antiquities already obtained, after the limited space temporarily assigned to the Babylonian section in the library building had been used. Many of the boxes then in our possession could not be opened at all; others, after a hasty examination of their contents, were repacked and stored with the rest in the cellar of the library building.

About 6,000-7,000 tablets and fragments have been catalogued by the writer in Philadelphia since January, 1904; several other thousands of cuneiform texts in Constantinople during the same time. My impatient critics must not forget that, with all the well-known energy and enthusiasm displayed by the authorities of the British Museum, Sir Henry Rawlinson and his intelligent and hard-working assistants, nearly fifty years elapsed before Assyriologists could obtain a tolerably accurate idea of the contents of the beautifully inscribed baked fragments of the infinitely better preserved Library of Ashurbanapal. I plead for only ten years for my associates and myself to demonstrate the rich contents of the badly preserved fragments of the Temple Library of Nippur. Apart from the mathematical, meteorological, and chronological specimens submitted in the following pages and the first part on the Temple School, already in press, four more volumes on hymns and other religious Sumerian texts, syllabaries, and lexicographical tablets, and the official correspondence between the Temple officers and the Babylonian Kings are already in the course of preparation; to say nothing of four other volumes on dated documents, including the series on the Temple Archive recently successfully opened by Professor Clay.

The writer is only human, and cannot do more than devote his entire life and the strength left in him (after eighteen years of continuous hard work and frequent deprivations of the ordinary comforts of life, in behalf of a scientific undertaking) to the resurrection of ancient Nippur. The power of every man has its limits set by nature, even when he is ably supported, as the editor finally is, by half a dozen of enthusiastic pupils and associ-

ates in the great work of deciphering and publishing the results of the University of Pennsylvania's Babylonian expeditions.

CHURCH FITTINGS.

ENUMERATING briefly the most important fittings of the interior of the church, Mr. Temple Moore, in a paper recently read before the Architectural Association, said that, taking first the altar, it is important that it should be "of ample size and properly proportioned, and that it should not, speaking generally, be overshadowed by its ornaments and surroundings.

"I think myself that the reredos, for instance, is a feature that is often very greatly overdone. Splendid as our old wall reredoses are, even they, I consider, rather tend to overpower the altar they were intended to adorn, and this defect is even more pronounced in some modern work. The triptychs of the late Flemish or German Gothic type, charming as they are in their own surroundings, are, as a rule, not a very suitable type of altar-piece for our English churches, their proportions being generally too tall for our buildings. As there is practically very little work of this class left in this country, even in a mutilated state, it is necessary often to look abroad for our models. I think more suitable types of altar-pieces for our buildings are to be found in France, or among examples of Italian Gothic, though these latter especially require to be entirely translated in their detail for our purposes. The eastern light should, I think, always be visible from the body of the church below the traceried heads of the bays of the chancel screen.

"The plan of omitting the east window altogether and filling the whole end of the church with the reredos is not to be recommended, except, of course, where there are practical difficulties with regard to light. I need hardly say that whether the reredos is of wood or stone, it should be as a general rule richly gilt and colored. Of course, the altar-piece may be entirely treated with hangings, and where this is properly done probably there is no more suitable or dignified treatment. An exaggerated dossal, however, with its narrow tester, looking rather like a portion of a very big bed, is to my mind to be avoided, and a superfluity of upholstery is undesirable.

"Where the chancel can be of considerable length there is no doubt that a high rood-screen is the greatest possible ornament to the interior, but I think it requires very considerable depth behind it to give it its true value. It is curious, however, the prejudice one frequently meets against a screen. It is certainly not the case that a properly designed oak rood-screen of the type suitable to a parish church obstructs any necessary view, though many people seem to think so. This is sometimes avoided by the use of iron, but I do not think that iron screen-work ever looks quite satisfactory with our English work, and certainly the modern examples one sees are rarely successful.

"The font should stand in the nave, preferably in the centre near to the western doors. As a rule, the font is not now generally given at all a sufficiently prominent position. It should always have a cover, however simple, and this latter feature may be, as you know, very beautifully treated.

"The pulpit is another important piece of furniture, which should be carefully designed, and I think that as a rule wood is preferable to stone. It requires careful proportioning as to height in accordance with the size of the building, and may often with advantage have a sounding-board or canopy.

"The front of the organ (it is hardly correct now to speak of an organ-case, where the instrument is frequently as big as a cottage) facing the church, or chancel, can be made to look very well if skilfully treated.

"There are unfortunately no Gothic examples left in England (there is but one in Wales), though there are some very good XVIIth century ones. The illustrations in Hill's book on the organ give a number of Gothic examples from abroad, many of which are most suggestive.

"The introduction of electric light has made the treatment of this very important modern requirement much easier than in the days of gas, one of the chief advantages being that a great deal of dirt will be avoided, and may make possible a more frequent use of colored wall decoration; and if this could take the form of simple figure subjects, painted in distemper on the walls, such as one finds traces of in almost every old church, I believe it would add greatly to the interest of the interior, judiciously introduced and designed and executed on the right lines."

COMMUNICATION

LAUGHABLE OR PITIABLE, WHICH?

February 12, 1907.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—We are enclosing to you herewith certain communications between the Building Commission for the proposed City Hall in Trenton, N. J., and ourselves.

We think that the stand the commission takes may be of interest to you in connection with the symposium in your magazine upon competitions.

The programme is being brought to the attention of the Philadelphia Chapter A. I. A. and the New Jersey Chapter A. I. A., and it is to be hoped that some action may result which will be to the greater benefit of the people of the City of Trenton.

Trusting that the communication may be of some benefit to you, we are,

Very truly yours,
LACEY AND ADAMS,
Associate Archtiects.

Trenton, New Jersey, January 23, 1907.

PROGRAMME GOVERNING THE COMPETITION DRAWINGS TO BE SUBMITTED FOR A BUILDING TO BE KNOWN AS THE CITY HALL.

The building will be located on an important street, and the grade of the lot may be considered as being level.

The lot will have a frontage of about 250 feet, and a depth of about 200 feet.

The award of four prizes will be made as follows:

First, $400; second, $300; third, $200; and the fourth prize, $100.

No prize will be awarded to the winner of the competition.

Drawings Required.—One front elevation, scale 8 feet to the inch.

One end elevation, scale 8 feet to the inch.

One transverse section, scale 8 feet to the inch.

First, second and third floor plans, scale 8 feet to the inch.

The rendering of the drawings may be optional.

The cubic contents of the building should not exceed 850,000 cubic feet, figuring the basement as 12 feet in the clear.

Rooms Required.—Tax Receiver, with ample public space and vaults; Assessors, public space and vaults; City Engineer, draughting-room, private office and large vault; Street Commissioner's office; room for Water Board, with ample public space, one meeting-room and vault; City Treasurer, vaults; City Clerk, public office, private office and vault; Comptroller, vaults; Building Inspector, one office; Overseer of the Poor, one office; Mayor's private office and reception-room; City Council Chamber and space for the public; District Court, clerk's room, jury-rooms and Judge's retiring-room; Park Commissioner's office; Police Commissioners' and Fire Commissioners' meeting-rooms; six unassigned meeting-rooms. Toilet-rooms on all floors.

The Judging Committee reserves the right to reject any or all of the drawings submitted, provided, in their opinion, none of them are suitable for the purpose stated; but in any case the award of prizes will be made.

No mark of identification is to be placed upon the drawings, but a sealed envelope, also unmarked, shall accompany the drawings, containing the name and address of the competitor and an estimate of costs. As the drawings are uncovered by the Judging Committee the drawings and the envelope will be numbered with the corresponding numbers.

The commission for professional practice as approved by The American Institute of Architects shall be paid to the winner of the competition, provided his standing as practising architect is satisfactory to the Building Commissioners, and is registered as practising architecture in the State of New Jersey.

The drawings shall be delivered on or before March 1, 1907, before five o'clock, at No. 137 East State street, Trenton, N. J., and marked on the outside cover "City Hall Competition." For any further general information apply to the Building Commission.

FERDINAND W. ROEBLING,
(Signed) C. EDWARD MURRAY,
JONATHAN H. BLACKWELL,
Building Commission.

January 29, 1907.

FERDINAND W. ROEBLING, ESQ.,
Chairman of the Building Committee.

Dear Sir:—We acknowledge with pleasure the receipt of the programme for the competition for the selection of an architect for the "City Hall" in Trenton. After careful consideration of the outline we find it desirable to have certain information not given in the programme, in order to more fully understand the requirements of the city of Trenton and your commission.

The programme asks for space for assessors. We would like to know whether this is a large or small department, *i.e.*, how many assessors or clerks, etc.? There is but one Council-chamber mentioned. Are we to understand that there is a single body governing the city of Trenton? What would be the approximate number of Councilmen to be provided for? Can you give any more definite idea about the size of the District Court-room required in this building?

The answers to these questions and any other information which you can give will be most gratefully received.

We would like to know in this, as in some other competitions in which we have been entered, who will be the members of the judging committee. If you cannot give the personnel, will you

state the occupations to which the gentlemen will likely belong? Is this competition limited to a certain number of architects selected by your commission, or is it open to all who apply?

We should like to have answers to these questions to know the circumstances in which we will be placed in submitting designs. Would it be possible, in view of the short period of time for the study of the problem, to have all the drawings submitted at a scale of 1-16 of an inch to the foot, except the main elevations, which would be at 1-8 inch to the foot?

This we ask in order that we may have an opportunity to more fully study the problem which is offered in the submission of most of the drawings at a smaller scale.

We enclose herewith a stamped addressed envelope for the convenience of a reply to our questions.

Thanking you for the favor of an early reply, we are,

Yours respectfully,
(Signed) LACEY AND ADAMS,
Associate Architects.

January 30, 1907.

MESSRS. ADAMS & LACEY:

Gentlemen:—I beg to acknowledge your letter of the 29th, and in reply beg to say that the information given on the programme is all that the commission will give the competitors, whoever they may be; they must take sufficient interest in the matter to inform themselves concerning the space mentioned in your letter. If the commission settled all the points you raise, it might as well make the plans. The object is to get information from the standpoint of each competitor.

The judges of the competition will be the three members of the City Hall Commission. The scale of the drawings asked for cannot be changed without changing them for all, and I see no reason for making any change at this time.

Yours very truly,
(Signed) F. W. ROEBLING,
Prest.

February 11, 1907.

F. W. ROEBLING, ESQ., *President:*

Dear Sir:—By your courtesy we received on January 28 a copy of the "Programme Governing the Competitive Drawings to be Submitted for a Building to be Known as The City Hall," at Trenton, N. J.

On January 29 we addressed to the Commission in accordance with your instructions, "For any further information, apply to the Building Commission," a letter asking for certain data necessary to all competitors, in order that they may be able to present a solution not founded on suppositions. Your answer that "The information given in the programme is all that the Commission will give the competitors, whoever they may be," and that "if the commission settled all the points you raise it might as well make the plans," is ungracious and contradictory.

You say that "The object is to get information from the standpoint of each competitor." This is a reversal of the usual object, which is the selection of an entirely capable architect by a competition in the programme of which all the necessary requirements are fully stated. Your decision further puts an additional burden of expense upon each competitor. This is manifestly unfair, since only five firms can receive any award for their drawings, which at the scale of 1-8 inch to the foot would cost every firm competing at least $600. Some architects may enter competitions to spend money for the public good. Is it not fairer to offer all an equal chance to compete on a definite set of requirements with the least expenditure of money for the benefit of the possible client?

The programme, further, does not state whether the plot is on a corner or in the block, with only one or two street fronts, a most important thing to know when designing a building of a monumental character; for purposes of the competition it might have been arbitrarily decided that it was one or the other.

On January 10 we had a letter stating that "the Commission has employed an architect to give advice and make preliminary sketches."

Since your last letter we have heard a rumor that the architect who acted as adviser will be allowed to enter the competition. We can hardly credit this as truth, because of the obvious unfairness of such a course to all other competitors, for his intimate association with the Commission and their views would enable him to carry out in his drawings their ideas, which no other competitor would be able to acquire.

This letter is written to lay before you a reasonable statement of the inadequacy of the programme as now existing, hoping, that a fair presentation of the facts will influence the Commission to make a clearer statement of the requirements, secure an adviser, who would write a programme and advise the judging committee in the matter of their decision. This will necessarily involve a delay in the receipt of competitive drawings; the delay being justified by the much more satisfactory results to the Building Commission and the People of the City of Trenton, which would thereby be attained.

Yous respectfully,
LACEY AND ADAMS,
Associate Architects.

ILLUSTRATIONS

HOUSE OF ROBERT C. WATSON, ESQ., ALEXANDER STREET, ROCHESTER, N. Y. MR. CLAUDE F. BRAGDON, ARCHITECT, ROCHESTER, N. Y.: TWO PLATES.

HOUSE OF CHARLES H. WANZER, ESQ., EAST AVENUE, ROCHESTER, N. Y. MR. CLAUDE F. BRAGDON, ARCHITECT, ROCHESTER, N. Y.: TWO PLATES.

ST. PAUL'S RECTORY, BARRINGTON STREET, ROCHESTER, N. Y. MESSRS. BRAGDON & HILLMAN, ARCHITECTS, ROCHESTER, N. Y.

HOUSE OF C. F. SCHMINKE, ESQ., BARRINGTON STREET, ROCHESTER, N. Y. MESSRS. BRAGDON & HILLMAN, ARCHITECTS, ROCHESTER, N. Y.

PLANS OF THE FOREGOING HOUSES.

ENTRANCE TO NO. 110 KURFÜRSTENDAMM, BERLIN, PRUSSIA. HERR MAX BISCHOFF, ARCHITECT.

This plate is copied from *Blätter für Architektur.*

Additional Illustrations in the International Edition.

"ZUM KÜHLEN WEIN," INTERLAKEN, SWITZERLAND.

GLACIAL ACTION AT LUCERNE, SWITZERLAND.

THE "TREIB" TAVERN ON THE URNERSEE, SWITZERLAND.

A STREET IN INNERTKIRCHEN, SWITZERLAND.

NOTES AND CLIPPINGS

THE DUC DE LOUBAT AND THE SCHOOL OF ATHENS.—At the annual meeting of the Académie des Inscriptions et des Belles-Lettres, held in Paris in December, M. Georges Perrot, the secretary of the society, read a paper on the life and work of the late M. Desiré Raoul-Rochette, the French traveler and archæologist, in which he took occasion to refer in flattering terms to the "princely" generosity of the Duc de Loubat in supplying to the École d'Athènes the funds necessary to carry on the work of excavation at Delos, which has resulted in bringing to light a vast amount of archæological treasure. M. Perrot called attention to the fact that as long ago as 1838 M. Raoul-Rochette, who visited Delos on voyage from Syria to Athens, detected "at a glance" the richness of the island as a field for exploration, proclaiming his belief in these words: "The mass of ruins which covers nearly the entire surface of the sacred island is so vast that it would require the continuous labor of a hundred workmen digging for many months to uncover all the buried monuments there. It is a task, however, which only a government is qualified to undertake, and I shall venture to bring it to the attention of King Otho, who intends to excavate at Delphi, and who would certainly find no less to reward him at Delos." These prophetic words had been realized, M. Perrot pointed out, not by Greece, however, but by private French enterprise, supported by the enlightened benefactions of the Duc de Loubat.—*N. Y. Tribune.*

A CHURCH BLOWN UP BY NATURAL GAS.—The town of Bunyan is located in the petroleum-producing district of western Ontario, and a number of the buildings are heated and lighted by natural gas, which is piped from wells in the vicinity. One of these buildings is the Baptist church at Bunyan. The edifice was constructed with heavy brick walls surmounted with a roof of

shingles, while from the front section extends a brick tower with a shingle top. The church was heated by a large gas-stove. The pipe conveying the gas became strained from the pressure, and the odor of the escaping gas caused a search to be made for the leak along the pipe which was laid under the flooring. To examine the pipe, one of the searchers lit a match, with the result that an explosion took place so violent that the side walls were almost entirely blown out. Although, as already stated, they were composed of brick, all but a small portion of the rear and front walls were completely demolished, the material being scattered over the ground a distance of nearly fifty feet from the building. Strange to say, the roof was but little damaged, the main injury being caused by settling in the centre, where the supporting wall had been carried away. The front section and tower were uninjured, but a chimney in the rear was partly demolished from the shock. The accident presents an interesting illustration of the direction of the explosive force, which appeared to be almost entirely lateral, not even a hole being blown in the roof.—*Scientific American.*

THE NAMING OF CARCASSONNE.—Though "Carcasso" was its name in the days of Roman Gaul, a more modern explanation, according to a correspondent of the *Irish Times,* has been given of its present denomination, and this tradition justifies the presence of Dame Casca's bust over the Porte Narbonnaise. Charlemagne once spent five years in endeavoring to take this stronghold. So long did he remain outside its walls that at last only one defender was left, a Saracen lady called Dame Carcas, not because it was her name, but because she was Queen and Lady of Carcasso. She was endowed not only with considerable courage, but with great genius. She got up bundles of straw to look like men at arms, and provided each one of these lay figures with a crossbow. She also constantly changed her headgear, and was ever on the move from one part of the battlements to the other, firing with deadly effect upon the enemy. Eventually she resolved upon persuading them that not only were the garrison numerous, but food plentiful, so she stuffed two pigs with corn and drove them over the walls, where they burst in the ditch beneath. When the emperor saw this he thought it was really time to raise the siege. She was, however, resolved upon making a clean breast of it. The army was beginning to move when they saw her throw open the gates and ask for a parley. The soldiers sought out the emperor and said to him, "Dame Carcas te sonne," from which words, it is alleged, came the modern name of the town. Charlemagne was so much struck by the account she gave of her powers that he confirmed her in her rule, and allowed her to hand down the government of the city to her descendants.

LONDON'S NEW QUADRANT.—A London architecturally beautiful is one thing, but that there is another aspect of the question when ornate buildings have to be used for business purposes is shown by the petition to the Commissioners of Woods and Forests, which is being signed by the lessees and occupiers of premises in Regent Street. Their complaint is that Mr. Norman Shaw's design for rebuilding the Quadrant, artistic triumph though it may be, introduces a style of architecture financially beyond the reach of the ordinary lessee, who has to consider the letting value of the premises when erected. A special point is made of the heavy columns on the ground floor, which will not only take up a great portion of the shop window space—a valuable consideration to the tradesmen—but, by breaking the continuity of the window line, will render it impossible for any one occupier to have a succession of shops. They go so far as to say that the design would ruin the thoroughfare as a shopping centre.—*London Globe.*

THE SPHINX.—The great Sphinx of Ghizeh bears no inscription by which we can tell its date. In 1816 Caviglia, who in modern times was the first to clear away the sand, found between its paws a stele of the reign of Thothmes IV., and, therefore, it was believed that the Sphinx was carved by that monarch. But in 1858 the excavations of Mariette uncovered a stele bearing the name of Cheops, on which is a reference to the Sphinx. The inscription is evidently of a late period, but is supposed to be an exact copy of an ancient carving, and the translation seemed to place the Sphinx earlier than the Pyramids, and consequently to prove it the most ancient piece of work in the world. Still there remained four lines carved on the base which could not be read, but M. Daressy has now deciphered them, and it appears that the inscription is in two parts. In the earlier lines there is no mention of the Sphinx; but the lines which date from the Persian occupation mention the repair of the Sphinx. There is, therefore, nothing by which we can tell the date of the monument, and the only evidence we have is the head-dress of the colossus. Its hood is ornamented behind with three bands, a large one between two smaller bands. Now, this is a fashion which only existed toward the end of the twelfth dynasty in the reigns of Usurtesen III. and Amenemhet III. As this family showed much zeal for the god Harmaklin, whose portrait the Sphinx is, it is probable that the monument is the work of Amenemhet III.—*London Globe.*

SHEARING TESTS OF CONCRETE.—The results of a series of tests conducted at the University of Illinois are discussed in a recent report by Professor A. N. Talbot. Although efforts were made to eliminate tensile and other stresses caused by the testing apparatus, it is clear that the attempt was only successful to a moderate extent, and, as Professor Talbot suggests, the shearing resistance of concrete will probably be found to exceed the values hitherto ascertained. Briefly stated, the general results were as follows: The tests indicated that the resistance of concrete to shear is dependent upon that of the aggregate as well as of the mortar, and in some mixtures the strength of the aggregate appears to be of the first importance. This is a point which may be commended to those inclined to favor the use of coke, cinder, and broken-brick concretes, because of their lightness or fire-resistance. For hard limestone concrete mixed in the proportions of 1 : 3 : 6 the resistance to shear at the age of sixty days is shown to be about 1,100 pounds per square inch, and for 1 : 2 : 4 concrete of the same character and age about 1,300 pounds per square inch. A point made clear by these tests is that the shearing strength of concrete should not be stated in terms of the compressive strength, as is sometimes done, for the reason that shearing resistance is governed chiefly by the strength of the aggregate and compressive resistance by that of the mortar. However, it may be said that the resistance of concrete to shear has now been shown to range between 50 per cent. and 75 per cent. of its resistance to compression. The values now ascertained are considerably higher than those accepted hitherto.—*The Builder.*

A CHINESE INN.—At Tieling it was necessary to sleep on the "k'ang," in a regular Chinese inn, and eat Chinese food. In these inns the first place entered is the kitchen, a square space with mud floor and raised mud ovens with clay and iron pots. From this one passes through a cloth-hung doorway into the inn proper. At Tieling this was about twenty by sixty feet, down the middle of which was an eight-foot aisle with packed mud floor. On each side were ranged the "k'angs," raised mud embankments, brick faced, some thirty inches high and six feet wide. On these are spread mattings, and here all guests roll themselves in their own blankets and sleep side by side, with their feet to the wall and their heads to the center aisle. A flue underneath runs the length of each "k'ang," and a fire at one end furnishes the hot air, which passes through and out at a mud chimney and warms the sleepers. The meals are served on these "k'angs" on little tables about a foot high. At these inns a teapot is always kept warm over a fire on a raised mud embankment in the middle of the main aisle. Chinese all drink tea, and it is due to this fact that they drink little well water, and thus keep down the rate of mortality. Tea to a rich Chinaman means concentrated tea, costing ten cents an ounce; to the poor, it is hot water with a few tea leaves dipped in; and to the very poor, simply hot water. It is significant of the increased wealth in the country that the majority of the lower classes, who heretofore could only afford hot water, are now indulging in actual tea. The inn at Tieling, which was similar to the inns all over northern Manchuria, had a big compound, surrounded by a high mud wall with gates. The long-distance carts going down the country with beans and bringing back goods are driven inside these compounds for safety from robbers each night, and during the great hauling season in winter these inns are crowded. The walls of the inns are of mud, plastered on a center wall made by weaving reeds together. The windows are mostly of oiled paper, with possibly one pane of small glass in the center. The rafters are round timbers, on which are spread reeds, then a layer of coarse matting, and then packed mud. In the cities the better inns have brick walls and tiled roof, but are otherwise about the same.—*U. S. Consular Report.*

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IN one place, at last, architects, or their advocate, have found themselves constrained to call a spade a spade. "Then this bill should be called 'an act to compel the employment of architects'?" asked Assemblyman Devlin at a hearing before the Judiciary Committee of the California Legislature. "That is certainly its object," was the frank acknowledgment of the attorney who was employed by the State Association of Architects to advocate the passage of Bill No. 453, introduced by Mr. Transue, of Los Angeles. We do not know what the provisions of Bill No. 453 actually are, but we gather from the context that it is intended to see the usual architects' license law and "go it one better," for it apparently is devised to prevent any carpenter, builder or private individual from erecting from his own plans a building intended for his own use, a privilege which is usually accorded to such persons by the ordinary license laws. By this new bill, apparently, an architect must be employed in connection with every building of any and every size and cost, wherever and by whomsoever erected by the State of California: it is the natural sequence and complement of the license law already in force, and shows on its face that it, like its progenitor, is in reality merely a trade union measure, and that the plea that the safety of the dear public is the controlling impulse is the shallowest of pretenses.

IF the public welfare were really endangered by allowing the erection of buildings where licensed architects were not employed, perhaps our scruples would be mollified; but, as it is probably a fact that nine-tenths of the buildings erected from their own designs by carpenters, builders and so-called architects who could not pass licensing examinations are actually constructed safely by rule-of-thumb methods which they are fully competent to employ, and as of the remaining tenth, where a risk has to be accepted, by far the larger part successfully stand the test of eventuality, it is plain that the risk to the public is not very serious, while the gain under license laws is not commensurate with the injustice inflicted. It is peculiarly human that architects, who are especially expert in the arts of design, should seek to keep the entire field of building construction to themselves, but they realize that this cannot be accomplished by compelling designers to pass examinations in the arts of design, for they realize that there are no examiners of superhuman powers of discernment, and that the canons of art are disputable and always matters of contention. They therefore fall back on matters that can be made the subject of examination and be compared with accepted standards. By so doing they practically throw their own case out of court and do gross injustice to many of the very men whose abilities as artists and designers, if allowed free exercise, are of prime importance to the growth and progress of the art. How much of a protection to the public the license system really is can be inferred by recalling how, a dozen years or so ago, a certain church in Washington collapsed in ruin, and yet the architect who designed that church—and we do not mean to imply that the collapse was necessarily or primarily due to any fault on his part—could have passed any examining board with an average of 90 per cent. plus.

SHORTLY after the introduction of the Indiana Architects' License Bill to which we referred a few weeks ago, the Minnesota Chapter A. I. A., has caused to be brought before the Legislature of its State a bill for the licensing of architects, based on the usual formula and predicated on the assumption that it is required to assure the safety of the public. Apparently, the people of Minnesota are at risk through the operations of incompetent builders and shyster architects, and the Minnesota Chapter A. I. A. comes to their relief and shows how, with the flirt of a pen and the payment of $25 as a license fee, all these now incompetent shysters may be instantaneously transformed into regular "registered architects" of the highest respectability and most unquestioned competence. This bill, like all others of its kind we believe, allows, within six months of its passage, the registration, without examination of any kind, of any person who can satisfy the examining board that he has been practising architecture as a profession for the preceding two years, and it would be almost hopeless to attempt to secure the passage of such bill without a clause of this nature. It follows, therefore, that these shyster architects, who, semingly, overrun the State, must be enrolled amongst the elect, for they, of course, will be amongst the very first to pay the license fee. How the safety of the public is to be assured by this hocus pocus must puzzle the sophists. Now, if the architects who promote and advocate license bills are

really sincere, they should take a leaf from the Code Napoléon, and ask to be held accountable *dans ses biens et bons* for the safety and perfection of their work during a term of years, as is the case with French architects and those who practise in the Province of Quebec. We do not, however, advise them to this course, for we feel that the conscientious practitioner already has anxieties enough on his mind, and claims enough on his meagre income.

IT is commonly believed that, when a father does not know what calling a son is fitted for, it is good advice to tell him to send the boy through a law school, since there are so many side issues to legal practice. We have always felt that the same advice was applicable to an architectural education, and the soundness of the belief is shown by the history of the late Albert W. Maas, who died in New Orleans last month at the age of eighty. Born in Berlin and educated there as an architect, he had already engaged in the felt-roofing industry, and had done much work in the laying of asphalt streets in Germany and England before he came to this country many years ago and settled in Chicago. There he was employed by the Chicago, Milwaukee & St. Vincent Railroad Company, and, with a partner, in private practice; but he seems to have been discouraged when his considerable property was wiped out by the great Chicago fire. Going South he organized, in Mississippi, the German Silk and Agricultural Association, which gave employment to many Chicago refugees. Later he took up a process for utilizing Spanish moss; but here, again, fire was a natural and successful opponent. In the last part of his life he was established in New Orleans, and here he was occupied with several inventions designed to utilize the by-products of the saw-mills. The last of his inventions was that much needed article, a white cement: this he is said to have perfected and, just before his death, sold to an Oklahoma concern, so the invention is not to be lost to posterity. As will be seen, although engaged at different times in many commercial undertakings, they were in each case closely correlated with building interests. In just this way there are now many men engaged successfully in commercial pursuits, the doors to which were opened to them from the main pathway of architecture.

THE spreading of the "city beautiful" movement, now so general, is illustrated in rather a curious way in Hartford, Conn. Set in the middle of a special park, and standing upon a fairly elevated knoll, one would feel that the State-house there was sufficiently isolated to be quite independent of the effect that surrounding buildings might possibly have on it. Yet a bill has lately been introduced, by Mr. Hooker, which provides that no building in Trinity Street or Capitol Avenue, at the side and rear, as we recall it, may have a height of over seventy feet. Profiting by the experience that Massachusetts has had because of fixing a height-limit for property neighboring the Boston State-house, the bill provides that within a year from its passage propertyholders shall receive compensation for the loss imposed on them by the new rule. If such a law can be enacted in the case of a building already so reasonably protected by existing conditions, we may hope to live to see the time when the property abutting on important public buildings everywhere may be bonded, in the way we suggested long ago, so that when any attempt might be made to improve such abutting properties the improvement could be carried out under restrictions that would prevent injury to the architectural effect of the dominant public building.

AT about one and the same time, there was enacted in the State of New York what is known colloquially as the "anti-tipping" law, and in England a law, framed for an identical purpose, which is known as the "Corrupt Practices Act." The general purpose of either law is to check, if not obliterate, the practice of giving and receiving illicit commissions through making both the giver and the receiver of such commissions guilty of a misdemeanor and punishable by heavy fine. There are few architects who have escaped the insult of a bribe proffered by some wily material-man—though it must always be kept in mind that not all commissions that are proffered to an architect are understood to be, or really are, bribes. It is not often, however, that an architect finds the tables turned on himself, even in a case where each party to the transaction knows there can be none but a generous and honorable intention. It seems that, in Chicago, the Home for the Aged, at Harrison and Throop Streets, finds itself unable to raise the two thousand dollars necessary to provide the building with the fire-escapes which the Commissioner of Buildings declares must be installed in conformity with the law, a law which the Commissioner is enforcing with determination and impartiality. Feeling the case was a hard one, the Commissioner has interested himself to raise the needed fund by subscription. But when a well-known firm of architects generously sent its check for one hundred dollars, Mr. Bartzen returned it with thanks, explaining that his dealings with architects were such that he could not be placed under any obligations to them. The action was irreproachable, of course, but on the principle *mens sibi conscia recti* the contribution might rightfully, and to the benefit of the Home, have been accepted.

A CASE of interest to architects, who may have to give expert testimony and do not know what charge to make for their testimony, has lately been reopened in one of the New York courts. The plaintiff, an alienist, sues to recover the unpaid balance of his bill, one item of which is a charge for six hundred and sixteen hours' time spent in consultation and examination at the comfortable rate of twenty-five dollars per hour. The case is of this further interest to architects, in that the subject of this expensive observation was Joseph Richardson, a builder and architect of sorts, who left an estate of some twenty million dollars, one of whose eccentric acts it was to build the notorious "spite house" at Lexington Avenue and Eighty-second Street, New York, and then to occupy it himself, finding for himself such comfort as he might within its ten feet of width.

ARCHITECTURAL DESIGN IN AMERICA.

AT the fortnightly meeting of the Architectural Association on Friday, January 26, Mr. Arthur Keen read a paper by Mr. R. Clipston Sturgis, of Boston, on "General Tendencies of Modern Architectural Design in America, and American and European School Work," as follows:

"AT the time of the break with the mother country, the architecture in that part of the country which was colonized by England was following closely on the lines of English work. At the end of the XVIIIth century the magnificent architectural record of the mediæval builders had become history, and archæology and Classic forms and Classic formula had taken the place of a vital art.

"The revived Classic forms with their fundamental principles of proportion and symmetry were, however, by no means unsuited to the new conditions among which they found development. The growth of cities, with the obvious requirements of direct thoroughfares and economical use of ground, encouraged and gave reasonable opportunity for the symmetry of Classic planning. From the practical and economical point of view the regular plan commended itself on all sides, and the fact that it was the prevailing fashion on the Continent was sufficient to fix it firmly as the universally-accepted method in America.

"In England it had its wise and reasonable expression in innumerable buildings in city and country, and while the rambling and picturesque plan of the Elizabethan and Jacobean work will always remain, to the foreigner at least, the distinctive and altogether perfect expression of English domestic architecture, the houses built under Queen Anne and the Georges have a charming quality of homelike comfort which in its way is unequalled and which, in its close adaptation to what one might call modern domestic conditions, was more reasonable than a plan based on feudal conditions.

"This was the condition architecturally that set its stamp on the English Colonies in America, and, inasmuch as we had not the wealth of the mother country, we followed the simplest and best expressions and were under no temptation to imitate the extravagances of the more ambitious English examples. It was that charming house in the close at Salisbury, and the host of examples that are in line with this work of Wren's—not Houghton or Blenheim—that guided the taste of the colonists. For awhile after the establishment of the United States our architecture continued in a quiet and dignified way to follow the trend of matters architectural in the Western world. The acts that made the United States an independent power were not acts of revolution in the ordinarily accepted sense. We had no quarrel with England's Government, as a form of government, but only with certain exceptional applications of it that were invented for our special benefit. When, therefore, we started to govern ourselves a republican form of government was adopted (we could not very well have had any other), but there was no radical change in our civilization, our outlook, or our environment. The fine arts, architecture and literature, have their proper place and their due prominence in such a social condition. With Jefferson as with Washington, these things were a necessary part of the equipment of a cultivated man; and the cultivated man was the one who naturally belonged at the head of affairs. These conditions, however, did not continue with us. A variety of causes demanded and produced a type of man essential for the development of a country of whose resources Washington had but the faintest perception. A type of man who must combine the indomitable courage and perseverance of the pioneer with the shrewdness of the promoter, who must be able to understand what the resources and possibilities of the country are and to be competent to develop them. Such men had neither the time nor the temperament for that sort of cultivation which every gentleman of the first generation considered essential.

"Even in the old world, the period from 1830-1870 was a dull time architecturally (to put it very mildly), and with us it was the abomination of desolation. Every kind of good precedent was thrown to the winds. Sound Classic precedent slipped into a spurious Greek executed in wood; Gothic, which had long been a terra incognita, even to the cultivated, was explored by the ignorant and rendered in wood with the aid of a jig-saw. Here and there were sporadic cases of fairly good work, but architecture as a whole was in a most deplorable state at the close of our Civil War. In judging work of this period, however, it is only fair to bear in mind the special circumstances that differentiated the United States from the older Western civilization. In the early days both economy and speed of construction favored the use of wood, and the necessity of clearing the land made it practically imperative. Following on good Georgian precedent much good and exceedingly clever and interesting work was done. Stone precedents and examples were interpreted in wood with a delicate and charming sense of the difference in the character of the material. Thus wood came to be established as the common building material, and as long as good taste ruled and modest means limited expenditure the results were charming. But when men without cultivation or taste acquired wealth the temptation to extravagance and eccentricity resulted in work wholly bad; and these bad examples were received with popular approval and caused rapid deterioration in the perception of what beauty and truth really meant. Rapid growth of wealth, and rapid expansion of the people into new territory, made it impossible to build in any but the quickest way, and the constant shifting of population encouraged ephemeral work. The contrast in the construction of railways in America and England is an excellent example of the necessities which forced upon America its methods. England, building for a compact and settled community, built with a view to permanency and safety. The United States, forced to build to serve scattered communities in vast unoccupied areas, with a sole eye to setting rails on which a train could run, built in the quickest and cheapest way, and it was years before there was time or money to consider better methods. In architecture it was the same story, and this accounts for, if it does not excuse, the amount of unstudied and vicious work done in the forties and fifties.

"After 1865, with the establishment of peace and the rapid growth of prosperity, people had once more a chance to pay some attention to the fine arts. There was an enormous demand for buildings, and those who in the seventies were thinking of architecture as a profession had the assurance that the well-equipped and well-trained architect had before him a great career. Our own architectural schools were in their infancy, but one or two had already begun to do good work at that time. The École des Beaux-Arts at Paris offered the best opportunity for sound training. Our people have always felt kindly to France, and have admired her position in the world of fine arts. To Paris, then, our students went to receive sound training on classic lines. At the same time attention was again directed, chiefly through English influences, to the value and beauty of mediæval work. You know what that was in England and how Ruskin and a host of saner followers of that great enthusiast reawakened in the hearts and understandings of all English-speaking people the marvelous treasures of the centuries that preceded the Italian Renaissance.

"With eyes newly opened our people began to see the sound common-sense beauty of the simple Classic work of our forefathers.

"Queen Anne and Georgian work and the buildings of the early days of Independence once more received the attention and reverence they deserved. A small but growing body of men began to stem the tide of horrors which had resulted from an ignorant and unreasoning demand for something new, something American, something which was not part and parcel of the effete civilization they fancied we had left behind.

"Added to this new self-respect for our past came a reawakening sense of the treasures of architectural history in mediæval times. It was like discovering a virgin field, so long had it lain fallow, and it was entered on with the greatest enthusiasm. Students returning from abroad had their sketch-books packed with picturesque and often very cleverly drawn sketches of French manor and farm houses, Romanesque work from the south of France, Early Italian work, the vigor of Tuscan palaces, the subtile beauty and gorgeous color of the south and of Constantinople, and the Gothic of France and England. It was a surfeit of good things, far more than we were able to digest. The result at first was a host of miserable failures, and, to offset this, a few brilliant successes.

"The few successes were, however, a great stimulus to the students following, and to those already at work. Each succeeding year saw the students begin work better equipped and the men in active practice gained knowledge rapidly through great opportunities, and by failure as well as by success. A nation with so little in the way of architectural inheritance, and with so few conservative tendencies, must necessarily be open-minded to new impressions. The American student abroad is constantly envying the greater opportunities which Englishmen have. They envy them not alone nor chiefly for the architectural treasures that surround them at home, for the wealth of precedent that

guides them aright in English ways, but for the handy Continent, France and Holland across the Channel, Italy but a few hours' journey farther on, so that a short holiday may at any time put the English architect in the midst of the best examples of architecture in the Western world. But, as a matter of fact, one is inclined to think that the American student, when he does cross the Atlantic, sees with more open eyes, and profits more readily from what he sees, and so is better off than the Englishmen; nor need he really envy those who live in the midst of the treasures of the Continent. The Frenchman may go to Italy to study, but does not often trouble himself to seek architectural knowledge in England or Holland. The German may travel in France and Italy, but apparently profits little by such experience. But the American student goes everywhere with the eager eye of one to whom all is new and wonderful. No native bias, no prejudice, no conservative respect for the work of his own people hampers him in his study.

"This is a great advantage. Another equally great is that architects in the United States are largely drawn from the class who have the means for a thorough education as a foundation. To limit a gentleman's occupation to the army, the navy and the church would be utterly unintelligible to an American. The church here undoubtedly holds an important place in the community, but that could not be said of the army and navy. Nor is diplomatic service as yet looked upon as an important and interesting field for the well-educated and ambitious man. Those who in England are by birth entitled to the best education are attracted to occupations which seldom tempt us. The result is that professions like architecture, medicine and the law are filled by the best-educated men. Architecture as a profession is as highly esteemed as the law, and rather higher than the occupations which until recently were looked upon as the only ones available for an English gentleman's son. The students who go abroad are generally men well equipped intellectually to take full advantage of the opportunities offered them.

"The result of this with us has been two-fold. The lack of established precedent and the wealth of ideas accumulated by study abroad has had the effect of urging our people to new effort, and our confidence in our great and prosperous future has helped us to believe that we would develop a new style of architecture, something American, something quite our own. On the other hand, the study of the fine old examples has encouraged a sincere and deep-rooted admiration of the masterpieces of the past, and a wholesome modesty as to our ability to equal them by anything that does not follow closely on the precedents of the past.

"Both phases have had their development here, and one is inclined to think that the sober sense of the present generation sees good in both points of view, but is far more governed by the former. That is, we may in time develop something especially adapted to modern use—the many-storied structure on immensely valuable land may bring its logical solution. The modern methods of construction—the steel skeleton—reinforced-concrete—may lead us to new expression; but, if we do so develop, it will be along the lines of the sound planning of the schools, the reasonable laws of construction and decoration that have been exemplified and proved in all the work of the past, and that have stood the test of time.

"The best architectural work of the past decade in America is not new, is not American, but is conservative. More conservative, one ventures to say, than much of the work of France, with its exposition style of architecture influencing work that is worthy of more serious treatment; more conservative than Germany, with its often grotesque strivings for an art that is new; more conservative than England, whose civic architecture has neither advanced mediæval development from the point at which Pugin placed it when the Houses of Parliament were built, nor improved on the Classic sobriety and dignity of St. George's Hall in Liverpool.

"American architects have been influenced more or less by all the architectural experiments of the Continent, and have had their own vagaries of experiment. Richardson dug into the treasures of Romanesque work, and conceived and executed one or two noble buildings with the spirit of the past and a certain modern vitality; but the experiments conducted by his numerous followers brought disgrace and obloquy on the style. Only in the backwaters of civilization is it attempted now. The decorative motives of India and the Far East were taken by some as the proper form in which to clothe a skeleton structure—the ornament being truly superficial rather than structural—a sound enough theory. But the experiments along this line were more interesting than convincing. Modern French has set its rather loud and often vulgar mark on much of our municipal and domestic work in the great cities. The debased examples of this, however, have been such a warning to the leaders in this movement that the work of these leaders is tending to the quietest, simplest and most refined expression of French art; indeed, the best work of this class is almost more closely akin to the precedents of Italy—the Renaissance fountain-head—than to those of France. English Gothic, especially its collegiate phase, has found its expression here, and with the chastened memory of the early American barbarities in this style, and a grateful affection for such sound old-school examples as Trinity Church, New York, the development here has not departed much from sound precedent, but in a general way tends toward what might have been expected if Gothic had continued its natural course. It is, perhaps, needless to add that there has been much ignorant handling of this most difficult style.

"The most discouraging tendency in American architecture to-day is its individualistic character. It is the natural outcome of our form of popular government, and it is one of the penalties we pay, along with untrained public service and ill-executed public utilities, for the uplifting effect on the community of popular control, for the self-respect and confidence engendered by the sense that each voter has of being a definite factor in shaping the progress and the destiny of his country.

"The effect of the individual tendency is two-fold; first, to encourage the expenditure of study, time and money on private projects, unhampered by limiting restraints, even those that are for the general good. The individual may exercise his taste and judgment, or give a free hand to the architect in whom he has confidence. The architect thus has exceptional opportunities.

"On the other hand, the individual tendency makes directly against all work that has for its primary element the general good; and, consequently, we lack in America good examples of work which depend more on the execution of a well-considered whole than on the excellence of detail. That our architects are able to handle well general problems of planning and composition was abundantly shown in the buildings surrounding the Court of Honor in the Chicago Exposition, and it has been repeated with more or less of success at Buffalo, Omaha and St. Louis. Such opportunities do not occur under ordinary conditions governing either Federal or large State and municipal undertakings.

"The absolutely autocratic control of Napoleon made possible the reconstruction of Paris. The almost equally autocratic or independent County Council cuts great thoroughfares through London, and lays down conditions for the buildings which are to line them. The control of great properties in the hands of individual owners makes possible the systematic and uniform treatment of a given civic area. You think promptly of Cubitt and Belgravia, but there is something pretty distinguished there which Kensington lacks. There are things in Bath not often rivaled to-day in city streets or squares. No such conditions exist with us.

"It may be said that France is now a republic, and yet Paris has still laws which, by limiting cornices and sky-lines, produce the regularity which is almost the only thing needed to give dignity and distinction to a great thoroughfare. It may equally be said that the South American republics, in their great cities, Buenos Ayres and Rio de Janeiro, show a sense of general civic beauty which is not to be accounted for by autocratic control or large holdings of real estate. This is true, but France grew into republicanism with a well-defined and established policy, and had sufficient taste to appreciate it. Brazil and the Argentine inherited the Latin outlook, which is primarily one of subservience to law and order; and temperamentally they, too, like the French, were sufficiently imbued with the love of art to appreciate this inherited tradition. England, from whom we inherited our architectural tradition, in common with most of the Anglo-Saxons, laid no great stress on general schemes of civic beauty.

"It is perhaps not strange, but it is certainly deplorable, that America, with its many brilliant examples of individual or isolated works of architecture, should be so absolutely lacking in distinguished civic architecture. No autocratic power, either of an individual or of a group of men, has as yet been sufficiently interested in large architectural schemes as to ensure their execution. Perhaps for us it is as well that there should not be and that we should turn, perforce, for support and encouragement to the people themselves; but I believe it is more than doubtful if this expression of art will ever be popular.

"In view of recent developments, we may await this issue with more patience and courage, for city after city has awakened to a sense of its lost opportunities in the past only to determine that those that lie in the future shall not be lost. Here at least we are reaping the benefit of the big exposition groups, and the lesson they taught of the value of concerted action, of standard dimensions and repeats, of a well-considered whole, in which the parts while admitting variety, yet conform to the general laws controlling the whole. Most of these are still in the condition of beautiful drawings embodying fine ideas; here and there one, as in Cleveland, is already taking form. While we may not expect the public to imitate or even fully understand these plans, we must for their development depend on the people for support, and unless our ideas are rational and practical, and the average man can see some return for his money—beauty is beginning to have its commercial value—we cannot advance far in the solution of broader problems.

"In our individual work where most progress has been made, our incursions into a variety of styles have resulted in a pretty generally diffused knowledge, a somewhat quick recovery from the strained effort to do something new and different, and a restrained sobriety among our best men which is having its influence in moulding taste throughout the country.

"On the whole, then, the general tendency of the best work in America is toward conservative lines, but in following this course one sees that intelligent use of precedent which shows that the stage of student and copyist is past, and that we are entering—slowly, but soberly and carefully—on the more responsible period of imaginative handling of well-understood laws. That we have learned that there are laws under which we work is a most important thing; once accept this, and we have gained that perfect freedom which is possible only to those who have learned to obey.

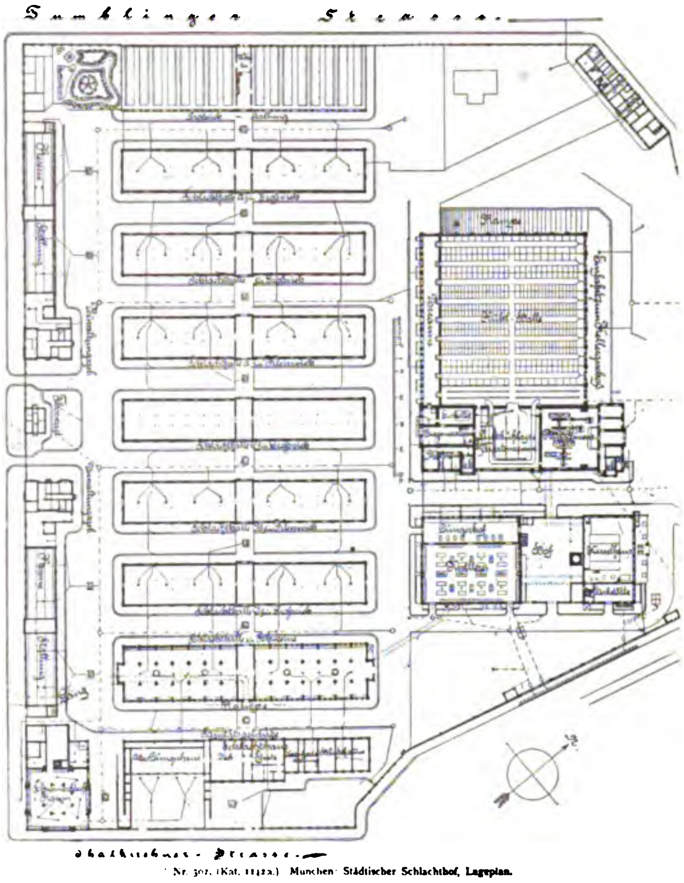
"The illustrations which are to be shown are necessarily very few, and cannot be considered even representative of the vast architectural field in the United States. You have perhaps noted that I have said no word as to the old French influence and its architectural records in Detroit, St. Louis or New Orleans, or of the Spanish work in California and on the Mexican border. These have had a strong influence, and especially the latter—the charming work of the Spanish monks on the Pacific Coast. Some of the slides will show modern interpretations of this.

"With the exception of the first few slides the work shown is nearly all quite modern. These few early slides are simply to show the kind of thing we had in colonial days, a type familiar enough in England, but very cleverly adapted for execution in wood here, and what we were doing in the early days of independence. The gloomy architectural period from then up to modern days might have been shown as a warning, but that no body of English architects needs."

SANITARY FEATURES OF MARKETS AND ABATTOIRS.[1]—IV.

LARGE public abattoirs are composed of a number of buildings. There must be large sheds, pens and stables for the housing of the animals which arrive; these buildings are sometimes subdivided into separate sheds for cattle, calves, sheep and pigs. They present no special features worth mentioning. Next, we have the buildings where the animals are killed, and in large establishments there are usually separate slaughter-halls for each group of the animals named. There must be also special buildings for the dressing of the carcasses, for the cleaning of the meat and the entrails, also buildings for the cold-storage of dressed meat, and special buildings must be provided for diseased or suspected animals. Then again, we have buildings devoted to the commercial utilization of the offal, such as fat-rendering and bone-boiling, and cremators or destructors for the condemned meat. An administration building should be provided containing the general offices, the rooms for the sanitary inspectors and veterinary surgeons, and laboratories for the microscopical examination of pork. There is usually provided a separate boiler and engine-house, containing also the power-plant, viz., the pumps for water-supply, the dynamos for lighting, and a complete refrigerating and ice-making plant. In rare cases a regular wholesale meat market forms a part of the abattoir. In European cities the bureau for the official inspection and control of the meat supply is considered of the highest importance, and a good deal of space is devoted to it. All the buildings named must be equipped with the latest and best labor-saving devices, with all modern sanitary conveniences, and with impervious and properly-drained floors, while a liberal water-supply and other equipment facilitate the maintenance of cleanliness.

The value of the by-products of the slaughtering processes is nowadays recognized to be quite high; usually a considerable economy in the management of an abattoir may be effected by their proper utilization. The buildings in which the by-products, such as blood, hides, tallow, bones and intestines, are treated should be situated conveniently near and form adjuncts of the slaughter-houses proper. It is necessary that all these buildings should be kept under proper sanitary supervision. The noxious vapors and gases arising from the cans and kettles of rendering-establishments must be made to pass through condensing tanks and then under the fires of the boilers, and be finally discharged through the tall chimney-stack of the boiler-house.



LAYOUT OF CITY ABATTOIR, MUNICH, BAVARIA.

The correct grouping and location of the several buildings is important and depends somewhat upon the size and shape of the lot; it is also dependent upon the provisions available for good shipping connections. No general rules for the planning of abattoirs can be given, as each special case forms a problem in itself.

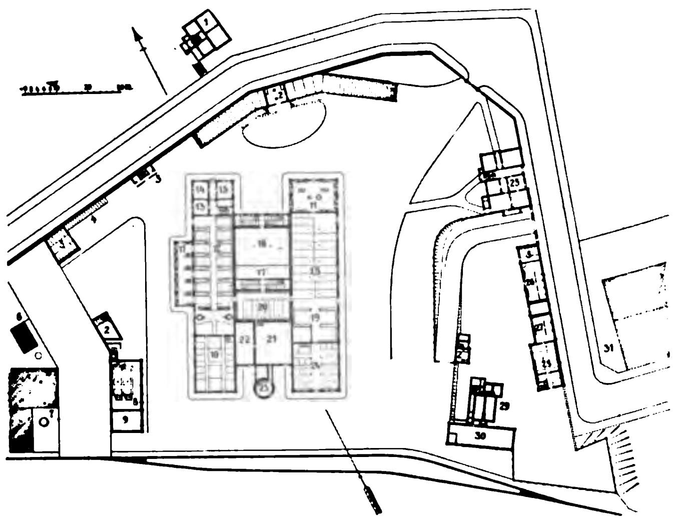
In general, three types may be distinguished. In the first of these the buildings are all concentrated, roofed over and interconnected by covered passages. This type requires a smaller floor-area and causes a reduction in the cost of construction; its compactness favors easy management and superintendence, but the drawbacks are that the building, as a whole, can only be enlarged with difficulty, and that there is often an insufficient supply of light and air. In the second type the different buildings are separated by open courts, streets or alleys, and each building may readily be enlarged if necessary, and light and air are provided in abundance. In the third type, which may be called a combination of the other two, the buildings are separated from one another, but interconnected by covered passages and courts, and this is probably in many cases the best system.

The majority of abattoirs are buildings of only one-story, the killing house being located at the ground level, while the by-products of slaughtering are stored in the cellar. There are, however, a few modern examples of buildings of many stories, and in these it is customary to take the cattle to be slaughtered to the highest floors, and then to locate the different processes

[1] Continued from page 61, No. 1623.

of dressing the carcasses, of cleaning the hides and of treating the offal on the lower floors. An example of this type of abattoir may be found in the new model slaughter-house built in New York City for the Butchers' Association and located at Eleventh Avenue and Thirty-ninth Street, described and illustrated in the *American Architect* of June 16, 1906.

Among the buildings forming a public abattoir, the one in which the slaughtering or killing of the animals and the dressing and chopping of the carcasses are done is of prime importance. The arrangement of the structural features of the killing-house or hall require, therefore, special mention. We may distinguish two different types. In the first type, which is the one most universally met with in German abattoirs, there is one large open and undivided slaughtering-hall in which all the different butchers work together, whereas in the second type there are provided two rows of smaller killing compartments, arranged one on each side of the central aisle, each compartment being rented out to one or to several butchers. This type of killing hall is the usual one in France, in Belgium and in Italy. The first described type is, however, very much preferable from a sanitary point of view, because it facilitates the official supervision of the slaughter trade, and necessarily to some extent involves a mutual inspection by the butchers. The first type is also cheaper in construction, for it does away with the many dividing walls of the compartments. For the different kinds of animals there are usually provided separate and distinct slaughtering-halls; hogs, in particular, are nearly always killed in special buildings.



Nr. 305. (Kat. 1164) Solingen Städtischer Schlachthof, Lageplan

LAYOUT OF TOWN ABATTOIR, SOLINGEN, PRUSSIA.

The outer walls of slaughter-houses may be built of either brick or stone, or else of iron, with glass sides and roofs. In the construction and finish of the interior, it should be borne in mind that there is a great deal of constant wear and tear in such buildings, and hence that the first consideration is the durability and strength of the building materials employed. Woodwork should be used as little as possible. On account of the slaughtering processes carried on in the buildings, it is quite essential that the inside walls to a height of six or seven feet from the floor should be rendered impervious, smooth and easily washed, so that dried blood and scraps of flesh adhering to them can be readily removed by means of warm water and soap. The walls may be faced with light-colored glazed brick, or else they may be tiled with white glazed tiles. In cheaper constructions the brick walls are coated with asphalt varnish, and any wooden posts or partitions should be treated in a similar manner.

The floors of a slaughter-house should be solid, non-absorbent and impervious to moisture of any kind; moreover they should be hard and durable, but they should not crack, nor should they be too smooth or slippery, as this would interfere with the operations of the butchers. It is somewhat difficult to reconcile these conflicting requirements. Asphalted and concreted floors have been much recommended, but on trial they have, in some buildings, proved to be only partly successful. Asphalt floors are apt to become soft in summer time; the cement floors, on the other hand, may crack, or they become chipped or broken by the axes of the butchers, and require constant repairs. In some cases roughened bluestone slabs have been used with success; another good pavement is formed of two layers of hard-burned brick laid on edge in cement or in concrete, but this is necessarily expensive. Many butchers maintain their preference for a wooden floor, probably on account of its non-slipperiness, and notwithstanding its lack of durability and the fact that it absorbs organic impurities. Heavy planks of Georgia pine, caulked thoroughly watertight at the joints in the manner of a ship's deck, are satisfactory, but since the planks become rapidly splintered by the blows of the axe used in slaughtering or in dividing up the killed animals, it becomes necessary to put down a second layer of planks, in other words a double flooring, and to keep the same always in thorough repair. The floor should always be well graded and sloped to floor drains; sometimes special floor troughs or gutters are provided and arranged so as to catch the blood and to carry the same to special receptacles. The upper parts of the walls and the ceiling should be plastered or whitewashed at frequent intervals. The roof may be pitched and covered with slate, or made flat and finished with metal or tar-and-gravel.

SANITARY FEATURES.

1. *Water-Supply.*—In centralized slaughter-houses enormous quantities of water are used during the day; hence one of the chief requirements is an abundant and very liberal supply of both hot and cold water. In Europe, where water is ordinarily not used as liberally or wastefully as in the United States, the supply required is estimated at 75 gallons per animal per day. While this figure includes the allowance for the watering and washing of the cattle, and for the washing of floors and the sprinkling of the roadways, it does not include the volume of water required for the condensers of the refrigerating-plant. This latter is estimated separately at 150 gallons for each head of cattle slaughtered.

The water-supply may be obtained from the mains of the city water-works, or else it may come from a separate local plant. Where the abattoir is located at some distance beyond the city limits, it often becomes necessary to provide a separate water-supply system, requiring one or several wells, a set of steam-pumps and one or several high-service water-tanks, or else pressure-tanks. A complete system of water-mains should be installed covering all buildings of the abattoir, so that water may be drawn at any place where it may be required for washing, flushing or other use. Provision should likewise be made for a good supply for fire-protection, including the setting of plenty of fire-hydrants. As the buildings are not very high, and as most of the water is drawn at taps located at the ground floor level, the water-tank for abattoir use need not be raised very high; but to obtain sufficient pressure at the hydrants for fire-extinguishing purposes, it is best to arrange for a separate elevated water-tank for fire-purposes, or else to use a large pressure-tank located in or near the power-house.

Sometimes the water distribution is so arranged that the city supply, where available, is used for fire-purposes, while the local supply covers all other water requirements.

In the buildings, the main supply-pipes should be ample in size, and should be carried either at the cellar ceiling, or else high up on the first floor, where the pipes are not so liable to be damaged. Numerous inside taps are required, not only at the troughs and other plumbing fixtures, but also for hose use.

Hot water is likewise required in large quantities, particularly at the places where the cleaning of the intestines is done; also for the baths and lavatories for the employees. It is best to arrange this by providing in the power-house a large hot-water tank or a feed-water heater heated by exhaust and by high-pressure steam.

2. *Drainage.*—For all abattoirs good drainage is very essential. In the main slaughtering-hall numerous vitreous-ware or solid porcelain-ware troughs should be provided for the use of the butchers, each of these having a trapped waste-pipe and connection with the main sewer of the building. The floors of the hall should have trapped floor drains at suitable points, and sometimes open gutters are provided, besides special troughs for the removal of the blood from the slaughtered animals.

The general rules on sewerage and plumbing, which have been formulated for other classes of buildings, are also applicable to slaughter-houses, hence it is superfluous to go into details.

Where the abattoir is composed of many buildings, a general sewer plan should be laid out. In many cases it will be found advantageous to provide two drainage-systems, one for storm water from the paved yards and roadways and for the roof drainage, and a second separate system for the waste-water from the buildings, including the toilet and bath rooms.

The main sewers are usually pipe-sewers, constructed of vitrified or glazed sewer-pipes, or where they are larger and egg-shaped, built of concrete. The sewer-pipes within the buildings should be of heavy iron pipe, and care should be exercised to give them a sufficient fall to prevent deposits and stoppages. All catch-basins, troughs and sinks should have efficient strainers, and flushing arrangements should be provided.

Man-holes should be placed at junctions and at changes in grade and alignment. The bottoms of the man-holes should be built on a level with the flow line of the sewer, and there should be no depressions or sumps in the bottom, which would collect and retain deposits of organic putrefying matters. All sewers should be ventilated in the most practical and efficient manner.

3. *Purification of the Waste-water.*—Although the waste-water from abattoirs is not nearly as highly polluted as that from some manufacturing establishments, yet it is necessary that it should be purified before being discharged into a water-course. In Europe one finds at many abattoirs purification plants for the sewage. In all such instances it is, of course, advisable to exclude the roof and yard drainage from the sanitary sewers.

The means used for purification are either mechanical, chemical or biological, and sometimes a combination of two methods is employed. Very often the plants comprise large settling-chambers or regular septic-tanks in connection with one or more tanks for chemical precipitation. Coke and gravel filters are also much used. The favorite method seems to be at present chemical precipitation, but more recently biological sewage-disposal methods have also been installed.

4. *Lighting.*—Good daylight illumination may be attained by providing the building with plenty of large windows; this is essential both for the maintenance of cleanliness and for the careful inspection of the meat. Artificial illumination is secured by means of either gas or electric light. If the city gas-mains extend to a point near the abattoir, gas lighting may be used; a separate gas-lighting plant is not recommended, except possibly an acetylene lighting plant. Steam being available in the power-house, it is easy to arrange for an individual electric-light plant.

5. *Toilet and Bath Rooms.*—There should always be provided the necessary number of well-kept and well-ventilated toilet-rooms, arranged entirely separate for both sexes. Modern abattoirs are also frequently provided with showers or rainbaths, for the use of the butchers' help. These should be placed in the vicinity of the large killing-hall. The details of the plumbing fixtures suitable for use do not differ from those in universal use in other manufacturing establishments.

6. *Heating and Ventilation.*—Artificial warming is not usually required for the large killing rooms, but the offices, toilet and bath rooms, the microscopical laboratories and restaurants, should be suitably warmed in winter. Low-pressure steam heating is therefore usually installed. High-pressure steam is required for disinfecting purposes.

7. *Maintenance of Cleanliness.*—A good water-supply and proper drainage facilities will be a great help towards maintaining the entire establishment in a decent and cleanly condition. In addition, there should be the very best arrangements for the prompt removal of all waste accumulations which attract both rats and flies; all offal, animal manure, fat, etc., should be removed quickly and regularly.

The maintenance of absolute cleanliness in every part of the buildings is of the greatest importance. Nuisances arise not only from the accumulation of filth on or about the premises, but likewise from imperfect or improper modes of disposing of the slaughter-house refuse. A prompt disposal of the manure from the cattle yards, the pens and stables is indispensable and should be carried out with regularity. All streets and alleys throughout the abattoir should be swept daily and washed frequently. The places or buildings in which diseased animals are kept require special disinfection.

8. *Equipment.*—The mechanical equipment of slaughter-houses comprises a great variety of machinery, such as movable and stationary hoisting cranes, lifts, tackles and hooks, by means of which the killed animals are suspended in order to dress them and cut them up; trucks and iron tanks placed on wheels are required for the removal of the hides and the offal, barrels are provided for the blood: there must also be weighing scales, tables and chopping-blocks. For the watering and flushing of the floors from the inside hydrants a large amount of rubber hose is required.

One of the most important parts of the mechanical equipment is the refrigerating or cold-storage plant, and a modern large abattoir can hardly be successfully operated without one. In fact the success of large abattoirs began only with the introduction of the modern system of mechanical refrigeration, which enables the carcasses of animals to be chilled soon after killing, and which thus helps to keep the meat in a condition suitable for storage and transportation. It might be also mentioned that the development of the industry of shipping fresh dressed beef was largely due to the introduction of the refrigerator-cars on railways.

9. *Sanitary Inspection Service.*—The sanitary inspection service of abattoirs comprises three principal divisions, namely, first, the examination of the live-stock, before slaughtering, by veterinary surgeons; second, the inspection and microscopical examination of the meat of the slaughtered animals, and, third, the sanitary inspection of the buildings and of the sanitary conditions in which they are maintained. It is the duty of the veterinary surgeons to watch the arriving cattle with a view of preventing the spread of cattle disease. All suspected cattle should be at once separated and removed to pens specially designed for diseased animals.

The proper management of central abattoirs requires the strict enforcement of carefully drawn-up rules and regulations. In the Regulations governing meat-inspection, issued by the U. S. Department of Agriculture, on June 30, 1906, an attempt is made to cover to some extent the sanitation of the slaughtering premises. Considering the importance and the extent of the slaughtering industry of this country, the rules are not sufficiently elaborate or detailed, and they show a lack of technical knowledge; but they merit approval as being the first step in the right direction.

WM. PAUL GERHARD, C.E.

COMMUNICATION

COMPETITION FOR CONCRETE SUBURBAN HOUSES.

February 13, 1907.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—The Association of American Portland Cement Manufacturers is about to issue the programme of a prize competition for small suburban dwellings in concrete. As the programme has been prepared with care, I think you may be interested to print it in full in the next number of your paper.

It has been our purpose, while exacting the use of concrete for as large a part of each building as possible, to leave competitors free to use the material as their invention shall suggest, in combination with other materials or not, as they choose.

You will note that the prizes are generous—the first prize in each case being five per cent. on the cost of the building, in return for which only small scale drawings are required. It seems to be the necessity of the case that the designs should become the possession of the Association, which is apart from the practice followed in the case of drawings prepared for a specific building, but the amount and number of the prizes seem, to my mind, to warrant this, especially as the designer still has free use of his own design.

I am pleased to say that I have found, on the part of the Association, an admirable attitude of mind towards this competition; and in view of the recent discussions of the open competition, I think the publishing of the programme will be of interest to your general readers as well as to such of them as would care to submit designs.

Believe me,

Yours very truly,
E. V. SEELER,

PRIZE COMPETITION FOR DESIGNS FOR SUBURBAN DWELLINGS IN CONCRETE.

The Association of American Portland Cement Manufacturers invites designs for several classes of suburban dwellings, and offers prizes for the successful designs as herein set forth.

All designs will be judged by a Committee consisting of Edgar V. Seeler, architect, Philadelphia, Pa.; Louis H. Gibson, architect, Indianapolis, Ind.; Sanford E. Thompson, civil engineer, Newton Highlands, Mass., whose awards will be final and binding upon competitors and upon the Association.

Designs are to be for two classes: Class A—Single or detached dwellings. Class B—Twin or semi-detached dwellings.

In both classes the use of cement and concrete is desired, wherever practicable. Walls are to be constructed of hollow concrete blocks of plain, paneled or bush-hammered face, but not of rock-face; or they may be of monolithic construction. If hollow

blocks are used, interior plastering will be applied directly to the blocks: if monolithic construction, wall furring will be required. Wooden floor joists and roof timbers may be used; roof coverings may be of cement, tiles, slate or shingles. Concrete-block partitions, at least for the lower story, are preferred. Chimneys are to be of concrete blocks or brick; the use of cement for posts, cornices, porch railings and other details of simple design is suggested.

A prime requisite of domestic architecture, whether palace or modest dwellings, is that it should possess beauty, charm and appropriateness. The exterior finish of concrete walls has rarely been handled in a way to produce artistic results. The fault does not lie with the material, as it lends itself to a great variety of textures and colors.

The awards of this competition will be made with regard to, first, excellence in artistic quality; second, convenience of floor arrangements; third, economy of construction.

In each class, A and B, designs are desired for dwellings providing the following accommodations:

1. Three or four rooms, one or one and one-half stories in height, cost not to exceed $2,000.

2. Five or six rooms, two stories in height, cost not to exceed $3,000.

3. Seven or eight rooms, two or two and one-half stories in height, cost not to exceed $4,500.

The number of rooms stated does not in any instance include bath-rooms, although bath-rooms are desired.

The costs stated do not include the plumbing and heating systems.

In Class B the sum stated is understood to be one-half the cost of the double or twin house.

A cellar is necessary under part or whole of house.

Each design must show the plans of all stories above the cellar, three elevations and a section—all at the scale of one-eighth-inch per foot. The competitor may substitute a perspective and one elevation for the three elevations, if he so desires.

Each design must be accompanied by a brief typewritten statement of materials and method of construction proposed, cubic contents and itemized cost based upon local prices of materials and labor. Cubic contents are to be calculated from the bottom of the footings, up through the entire building, and including porches.

Each design is to be drawn or mounted on white cardboard or Bristol board, not exceeding 18 inches by 24 inches in size. Designs must not be submitted in mats or under glass. The style of rendering is optional: lettering is to be plain Roman. The name and dimensions of each room, the general outside dimensions of the plan and the heights of stories are to be given, and each sheet may bear the title, "Competition for Suburban Houses in Concrete." The class and subdivision of each design is to be shown by lettering, such as "A 1," "B 2," etc., in the lower left-hand corner.

Drawings are to be inclosed flat, not rolled, and delivered to the Secretary of the Association of American Portland Cement Manufacturers, Land Title Building, Philadelphia, Pa., not later than April 1, 1907, and marked on the outside, "Competition for Suburban Dwellings in Concrete."

As the competition is to be conducted anonymously, no cipher or nom de plume, identifying name or mark shall appear on any drawing or wrapper, but each drawing shall be accompanied by a card, bearing the name and address of its author, sealed in a plain opaque envelope and addressed to the Secretary. Any competitor who shall in any way violate the anonymity of the competition will be excluded from all participation in the awards.

Each design and its accompanying envelope containing the name of the author will, when received, be given a number by the Secretary, and the design will be known by this number until after the awards have been determined.

There will be first, second and third prizes for each of the six classes of designs as follows:

A1 and B1, $100, $60 and $40.
A2 and B2, $150, $100 and $60.
A3 and B3, $200, $125 and $90.

For each additional design awarded honorable mention, not to exceed six in number, $25; not more than two honorable mentions may be awarded in any one class.

Any competitor may submit as many designs in one or all classes as he may choose, but each design must be wrapped and contain the sealed envelope the same as if submitted by another competitor. The same competitor will not be eligible to receive more than one prize, either first, second or third, in any one class, but he may receive as many honorable mentions as the anonymous judgment of the Committee may award.

All designs receiving prizes or honorable mention shall become the property of the Association of American Portland Cement Manufacturers, which shall have the privilege of publishing them with the designer's name attached. Any designer receiving an award will be allowed to photograph or trace his design.

Designs receiving no award will be returned to their authors by the Secretary of the Association free of expense to the author.

No further information than that contained in this programme will be furnished to any applicant.

Additional copies of this programme may be had by applying to the Secretary of the Association, Land Title Building, Philadelphia.

ILLUSTRATIONS

HOUSE OF G. L. WILLIAMS, ESQ., BUFFALO, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.
PORTE COCHÈRE AND STABLE FOR SAME.

MARKET SQUARE, PULLMAN, ILL. MR. S. S. BEMAN, ARCHITECT, CHICAGO, ILL.

MARKET BUILDING IN THE SAME.

ACCEPTED DESIGN FOR THE BUILDINGS OF THE UNION OF AMERICAN HEBREW CONGREGATIONS, CINCINNATI, O. MESSRS. A. FECHHEIMER AND HARRY HAKE, ASSOCIATE ARCHITECTS, CINCINNATI, O.

HOUSE OF MRS. JAMES DOWNS, BARRINGTON STREET, ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

HOUSE OF KENDALL B. CASTLE, ESQ., ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

PLANS OF THE FOREGOING HOUSES.

Additional Illustrations in the International Edition.

PORTICO: HOUSE OF G. L. WILLIAMS, ESQ., DELAWARE AVE., BUFFALO, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS.

NOTES AND CLIPPINGS

GÉRÔME'S "BELLONE."—Judge Hough, in the United States Circuit Court, recently reversed the finding of the Board of General Appraisers relative to the duty assessed on the celebrated statue by Gérôme, "La Bellone." The statue was imported by Tiffany & Co., in September, 1904. The government assessed the statue at 35 per cent. ad valorem, as manufactured ivory and bronze, and from this the importer appealed, contending that as a work of art it was, under the reciprocal agreement with France, entitled to admission at a duty of 15 per cent. The statue is said to be worth somewhere between $30,000 and $50,000. An attempt was made by France to buy the statue from the sculptor's widow, and an offer of 100,000 francs was made, which she declined. Later Tiffany & Co. bought the statue, and, owing to the litigation, "La Bellone" is still in their possession, although it is said that many offers have been made for the work.—*Exchange.*

TURKEY AND THE ARCHÆOLOGISTS.—Sultan Abdul Hamid, taking a leaf out of the book of the King of Italy, has issued an edict strictly prohibiting, under all sorts of pains and penalties, the removal from Turkish territory of all objects in the shape of archæological treasures and antiquities. The terms of this law have been communicated by the Porte to the various foreign embassies and legations at Constantinople, and it is expressly stated, by order of the Sultan, that no exception will be made to it, and that the Turkish Crown will enforce its ownership of all antiquities and art treasures excavated from Turkish soil. There are now several American and German exploring parties who are engaged in costly excavations on the sites of Babylon and of Nippur, where so many of the cuneiform tablets, with their records of Assyrian history, have already been discovered. These excavations have been carried on until now by virtue of firmans obtained from the Sultan. But these firmans are explicitly repealed by the action of the new law.—*N. Y. Tribune.*

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SOCIETIES, PERSONAL MENTION, ETC.

TO one who loves his Boston, as we do—not the Boston of to-day in its intermediate stage, but rather the Boston of the time before the "great fire"—the report recently issued by the Boston Society of Architects is distinctly saddening, although it is unquestionably interesting, instructive and valuable in its potential effects. The topographical history of the city, the "Trimountain City," is rather curious. The three mountains, what boy of to-day can name them? he certainly cannot find them. Fort Hill is "leveled" out of existence, Beacon Hill, by some held to be in itself the mountain with the three crests, has been cut down by repeated grading operations until it remains hardly more than a hillock, while Copp's Hill, if that was the third of the mountains, has long been obliterated. Originally selected by the settlers as a site for their town, because the narrow "Neck" could be so readily defended by a palisade that should cut off the town from the mainland, their descendants, finding fortifications no longer needful, have gradually changed and obliterated nearly all of the original topographical characteristics of the site; the Neck has been widened, the shore lines advanced, the Back Bay filled in, the mill-dam done away with and the marsh lands reclaimed, and all this has been done on the level, the flat, unmitigated, uninteresting level. Bostonians in past years used to cry out against the prairie towns, because they were so flat and monotonous, overlooking the fact that they were doing their utmost all the time to reduce their own town to the same dreary condition. Having done all this merciless filling-in and leveling, they are now counselled by their advisers to do still more and fill up the South Cove, again level, and add more flat surface by constructing an artificial island or two in the new Charles River Basin. Perhaps, later, they will be advised to secure further flat territory by covering-in the space between the new islands and the present shores, allowing the Charles to flow along unseen below, as the Wien-fluss does in Vienna.

BOSTON'S topographical birthright has gone, but if it had to be sold—and all must admit that the town had outgrown its natural limits—the mess of pottage it got in return is of real workaday value, if not of the highest æsthetic savor. But, how much in time and money might have been saved to their descendants, if the first settlers had picked out a limitless piece of flat ground and asked some capable l'Enfant to plot out a city that could expand easily in any and all directions! It need not have been upon the seacoast, Boston cares nothing (now) for hers, but has allowed private interests to shut her citizens away from its natural beauties. Besides, does not Manchester, though an inland city, conduct commerce with all the world by sea? And yet, while we and everyone else must acknowledge that all these changes have been defensible, necessary even, and in some sense praiseworthy, it comes rather as a shock to find this committee holding up to Boston as patterns of excellence and exemplars worthy of imitation Buda-Pesth and Rio de Janeiro!

IT is a very admirable and useful piece of work that the Boston Society of Architects has done through its committee in investigating the situation and presenting so well reasoned and impartial a report; and that this is so is attested by the fact that, in meeting the cost of publication, there have been joined with the Society the Boston Chamber of Commerce, the Boston Real Estate Exchange, the Metropolitan Improvement League, the Boston Stock Exchange, the Boston Merchants' Association, the Boston Board of Fire Underwriters and the Master Builders' Association of Boston. The consequence of this highly respectable adjunction is, in the first place, that the *Report* is prepared in a very thorough and satisfactory manner, and in the second, and more important, place, that it will command an amount of attention that no report issued by a single body possibly could secure.

AS the matters treated of, though many in number, are in the main of purely local interest and significance, it is not worth while to discuss them here point by point. But there is one so unusual, so ingenious, so interesting and so in keeping with what Boston has already done in the line of converting aqueous surfaces into building-lots, that our readers everywhere can find an interest in it. Though born in the neighborhood and having crossed the bridges adjacent to it thousands of times, we never have appreciated the fact that the proposed Charles River Basin was to have an area "over ten times that of Boston Common," as the *Report* puts

it, and that in its midst it would be possible to create an island having an area of some six million square feet, while there would be on the Cambridge side a waterway as wide as the Seine is at Paris, and on the Boston side another waterway as wide as the Thames at London, spanned by bridges in each case. There are in fact three different schemes for an island here shown, and on one, which practically has the area of the Ile de la Cité at Paris, it is shown how at one end could be built the proposed Protestant Episcopal Cathedral, balanced by a large group of municipal buildings at the other end, while in between could be built hotels, apartment-houses, theaters, educational institutions, etc., on the dozen or fifteen blocks the layout would provide. This scheme, which we referred to some months ago, works out in a far more interesting and practicable manner than we had believed would be possible. It is an undertaking quite in line with the local habit and no one can deny that it has great landscape and architectural possibilities. The value of this suggestion, like that of all the others made by the committee, is not really lessened by the fact that no estimate of cost is presented in any case: the matter is presented academically, and the purpose is rather to direct present interest to the importance of considering the present situation as a whole and from every point of view before any of these suggestions are taken up for consideration with an eye to possible execution. The Boston Society of Architects certainly deserve the thanks and applause of their fellow citizens.

BUT far more important than the somewhat fantastic, if highly interesting, island scheme is the study that has been given to the needs of water-borne commerce, upon which the growth and prosperity of all seaports in the last instance depend. Boston harbor, land-locked and fairly easy of entrance, is rather liked by shipmasters, until it comes to berthing the large ships of modern type and size in the narrow and crooked waters of the inner harbor. This done at length, the ship-owners have to take their turn at being harried and worried because of the insufficient space, equipment and railroad connections that hinder the attempts to discharge and load with economical expedition. The committee proposes a remedy for this, by essentially abandoning the inner harbor to the Navy, the excursion, coastwise and fishing traffic, while deep-water commerce is cared for at a series of eight or ten piers, each about a mile in length, running southeasterly from South Boston and over the silted-up flats of the Old Harbor to the deep-water channel leading to Dorchester Bay. This channel and the bay, once properly dredged, would be kept clear by the scour from Neponset River, while the bay itself, now only used as an anchorage for pleasure-craft, would give a far better field for maneuvering and anchorage than is afforded by the present roadstead. Most of the dredging could be done by pneumatic dredges, which could deposit the spoil either on the marshes, thus reclaiming them for building purposes, or in the basin of the South Cove, thus helping to fill in that now rather useless sheet of tidal water. Of all the suggestions made by the committee, this one is surely of the highest importance.

THE architects of Philadelphia have lately taken a very unusual and unprofessional step, in that they have "entered politics" and have joined in making an appeal to the voters of the city to support Mr. Potter, the reform candidate for mayor. Unusual as the action is, its unquestionable propriety is instanced by the wording of the appeal, which declares that "contractors' agents must be removed from City Councils and replaced by honest men. We must choose as a Mayor a man of action, free from all associations with the men who have despoiled the city, from Torresdale to League Island. As architects, we have followed with indignation the revelations of the Smallpox Hospital and the State Capitol, typical as they are of government by the contractors, for the contractors." Admitting that the government of Philadelphia is a government of the contractors, for the contractors, by the contractors, it is not to be disputed that architects may concern themselves with the matter with a greater measure of propriety than almost any other class of men that could be named.

APPARENTLY there is a fair chance that, before long, the architects'-license law will be pretty thoroughly tested in one State at least, for besides the organized movement amongst San Francisco architects to test the constitutionality of the California statute, to which we referred some months ago, sporadic opportunities of getting the matter before a court seem to be springing up. Thus, last month, Mr. F. L. Soper, of Los Angeles, was haled into a police-court for practising architecture without having taken out a license so to do. Naturally, his lawyer set up in his defense a plea that the license law was itself illegal and, so, null and void. Amongst several points he makes in his plea is one that alleges that the statute nullifies itself, in that it excepts from prosecution those architects who take the trouble to notify their clients that they are practising their profession without having secured a certificate; another and, it seems to us, a probably stronger ground is the allegation that the statute is illegal because it confers upon the examining board an arbitrary power. It is interesting to know that the unfortunate architect was brought into court on the complaint of a revengeful contractor, and from this it can be inferred that spying, jealousy, revenge and all uncharitableness are to be found amongst the fruits of the thrice-blessed license laws.

IT is not surprising, though it should be regretted, that a "Landlords', Tenants' and Builders' Protective Association" has been organized in Brooklyn with the object of securing certain modifications in the present really very excellent tenement-house law. The present regulations are not too stringent for the general well-being of the community at large, and that is a far more important consideration than whether "three-family tenements" can be built with "perfect safety" in some other way than is now ordered, a way which will enable landlords and builders to secure larger returns on their investments than they now can under laws which certainly do not afford to tenants the maximum of protection, and but little more than a fair minimum of safety and decency.

STRENGTH OF BRICK AND BRICK PIERS.[1]

THE results of tests of brick and brick piers, which I have the honor to present, are selected from those which have been made in the testing laboratory at the Watertown Arsenal.

In this laboratory various kinds of constructive materials are tested, the results of which are published annually by the Ordnance Department, U. S. Army, in reports entitled *"Tests of Metals and Other Materials for Industrial Purposes,"* Congressional documents for public distribution. Twenty-five volumes have thus far been published.

From these reports and from current tests, which will appear in subsequent volumes, certain results have been brought together, results which are thought to be representative of their respective kinds of material, as qualified by the explanatory remarks relating to them.

Bricks are possessed of those physical properties which are common to other materials of construction. That is, they have strength to sustain loads, elastic properties whereby their dimensions are slightly changed during the period of loading, springing back to their original shapes, or nearly so, when the loads are removed, they expand and contract with changes of temperature, and it appears that their volumes are slightly affected when saturated with water, swelling minutely but perceptibly when wet.

Properties inherent in individual bricks are reproduced in piers constructed therefrom, modified, however, by the properties of the mortar in which the bricks are laid, and mortars vary according to their composition and age. In general, the properties of constructive materials are found to present many variable elements, some of which are under control, and some are not.

Passing at once to the subject of individual brick, values for the coefficient of expansion by heat have been observed over a range from .0000020 to .0000074 per unit of length per degree Fahrenheit. An ordinary value would be in the vicinity of 30 to 40 ten-millionths, that is, somewhat less than steel, which has a value a little above .0000060.

In making these determinations, the bricks were heated in water baths, basing the value of the coefficients upon the contractions displayed in passing from the bath of boiling water to one at about freezing temperature. It was necessary to use the measurements taken on falling temperatures, to eliminate the effect of the swelling of the bricks due to absorption of water.

The bricks usually swelled and were longer on the gauged lengths when in water at 33 degrees Fahr. than originally, when dry and in the air at 68 degrees. Moreover, after having been through the hot-water bath and returned to the cold one, their lengths were found still further increased.

When a brick saturated with water is frozen, it expands, due to the action of the water within. The amount of such expansion, in going from 33 degrees Fahr. down to, say, 25 degrees, measured on a length of six inches, has been found to range from a few ten-thousandths of an inch to above one-half a hundredth of an inch. Not infrequently, freezing a brick saturated with water is attended with a permanent increase in its length.

The elastic properties of brick have been observed, measuring the compressibility of the material as loads are applied, and determining the permanent sets when such have been acquired. Light-hard and salmon brick are most compressible—hard-burnt and vitrified brick are least compressible.

The moduli of elasticity, deducting the permanent sets in computing these values, range from less than 1,000,000 to a maximum of 10,000,000 pounds per square inch. Permanent sets, when they occur, are usually of small magnitude. From this it follows that the curves of compressibility are nearly straight lines; that is, in individual cases the amount of compression of a brick is nearly proportional to the load which is placed upon it.

The compression of the brick, in the direction in which the load is applied, is accompanied by an expansion in a lateral direction, which, as well as the direct compression, is a measurable quantity. The usual ratio of lateral expansion to longitudinal compression falls between the limits of 1-5th and 1-10th.

Density of structure is shown by the amount of water which a brick will absorb. Usually the absorption is reported in percentage by weight. A better method seems to be, to judge of the voids by the volume of water absorbed. Water enters a porous brick very promptly, less rapidly in the harder ones, but complete saturation is not accomplished even at the end of a week's immersion. Additional water is absorbed by exposure in a bath of hot water.

[1]Paper presented at the Twenty-first Annual Convention of the National Brick Manufacturers' Association, at St. Louis, Mo., February 7, 1907, by James E. Howard.

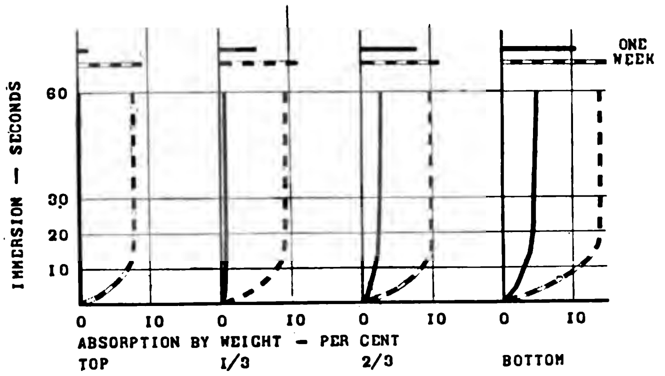
The compressive strength of brick extends over a wide range in values. The weight per cubic foot of the material, its density of structure, modulus of elasticity and compressive strength are mutually dependent features, and all are influenced more or less by the conditions of manufacture. The records of tests on compressive strength are numerous and generally available to all. *"Reports of Tests of Metals,"* 1894, and following years, contain many such results. Nearly 500 State, Territorial and other libraries are designated depositories for Congressional documents, where these volumes may be examined by those who do not have them personally.

The accompanying diagrams have been prepared to illustrate features connected with the properties of brick, brick piers and other materials of construction.

(No. 1) The rate of absorption of some dry-pressed and mud brick, which were burned side by side in a down-draught kiln, is here shown.

RATE OF ABSORPTION

BRICK FROM DIFFERENT PARTS OF KILN.



MUD BRICK, FULL LINES — DRY PRESSED, DOTTED LINES

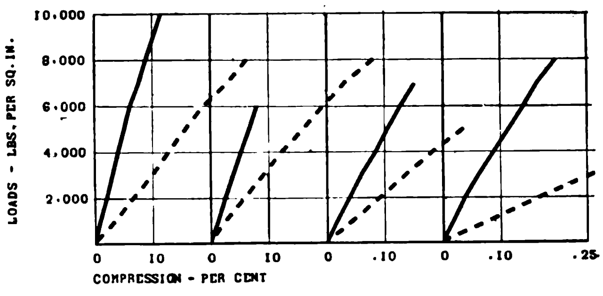
FIG. 1.

The mud bricks are shown by full lines, the dry-pressed by dotted ones. These samples were weighed at frequent intervals during the early stages of immersion. It appears that a considerable part of the water eventually absorbed entered some of the samples during the first fifteen seconds of immersion. After this time absorption went on slowly. The upper horizontal lines indicate the amounts which were absorbed at the expiration of a week's time. The lesser amounts of water absorbed by the bricks from the top of the kiln over those farther down will be noted.

(No. 2) On this diagram are shown the stress-strain curves of the samples of the preceding diagram. The greatest degree of rigidity is displayed by those from the top of the kiln, becoming

BRICK FROM DIFFERENT PARTS OF KILN

STRESS-STRAIN CURVES



MUD BRICK, FULL LINES — DRY PRESSED, DOTTED LINES

FIG. 2.

more compressible as they are taken from the lower parts. The order in which these curves are plotted is the same as in the preceding diagram, with reference to their position in the kiln. It will be noticed that the mud bricks from the bottom of the kiln displayed as much compressibility under a load of 4,000 pounds as the corresponding bricks from the top displayed under twice the load.

(No. 3) The variation in compressive strength is equally pronounced, according to position in the kiln, as shown by this diagram. The weights per cubic foot of the material are entered along the lower edge of the diagram. The highest strength cor-

responds with the greatest weight. This is characteristic, also, of other materials of construction, high resistance and high density of structure being found in the same samples.

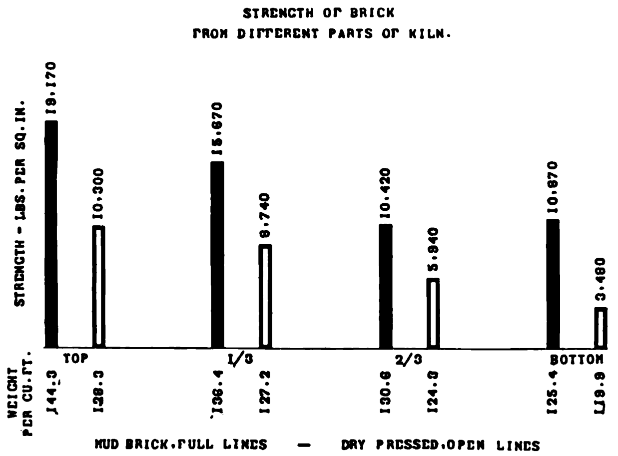


FIG. 3.

(No. 4) The properties of a remarkable brick are shown on this diagram. So phenomenal was its compressive strength that it is fully deserving of a special diagram of its own. To St. Louis belongs the honor of producing this brick, which far exceeded in strength any brick heretofore tested at Watertown Arsenal. This sample was tested on end, and reached a total load

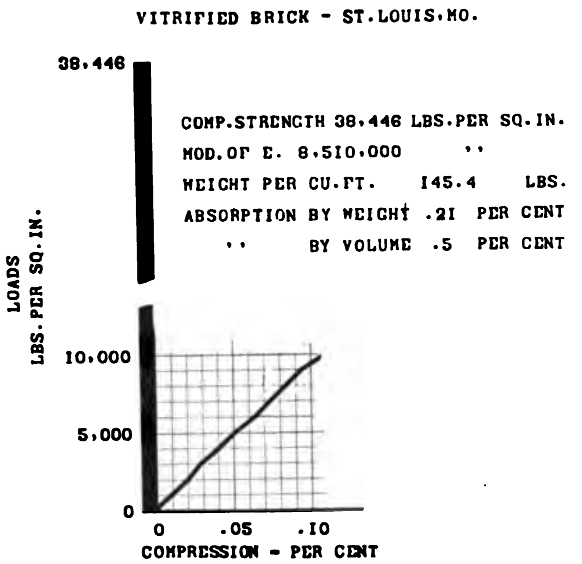


FIG. 4.

of 376,000 pounds on a surface 2.45 inches by 3.99 inches in cross-section dimensions. Fragments of this brick have been brought here for inspection, and are held in great respect.

(No. 5) The laboratory records were gone over, and from

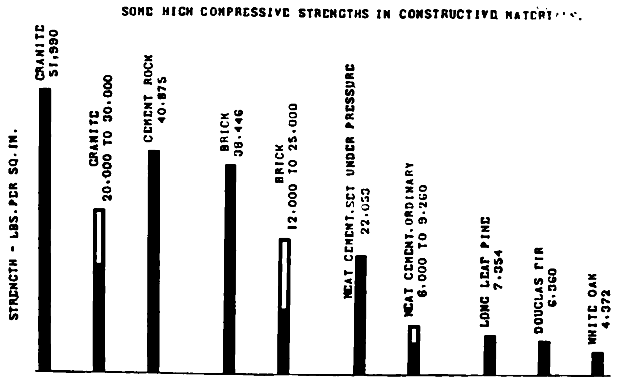


FIG. 5.

them were selected the results which appear on Diagram No. 5. These tests represent the highest of their respective classes. They are what have been attained, and are presented as standards of excellence. The granite, of 51,990 pounds per square inch compressive strength, came from a quarry in Asheville, N. C. Ordinary granites range from 20,000 to 30,000 pounds per square inch. The cement rock represents the stone from which a natural cement is obtained from the State of New York. The brick, of 38,446 pounds strength, has just been described. Ordinary values for hard-burnt brick range from 12,000 to 25,000 pounds per square inch.

Portland cement, set under pressure, attained the maximum strength yet observed in this material. This sample was exposed to an initial pressure of 14,000 pounds per square inch while setting. The strength given on the diagram was displayed by the cement at the age of fifty-seven days. The strength of ordinary Portland cement, tested neat, ranges from 6,000 to 9,260 pounds per square inch.

The strength of the white-oak stick seems low, taken in comparison with the strength of the long-leaf pine and the Douglas-fir wood. In small pieces, white oak has shown a compressive strength of 9,000 pounds per square inch. The figures here given refer to a post of commercial size.

(No. 6) The stress-strain curves of several representative materials are shown on this diagram. Steel and cast-iron are

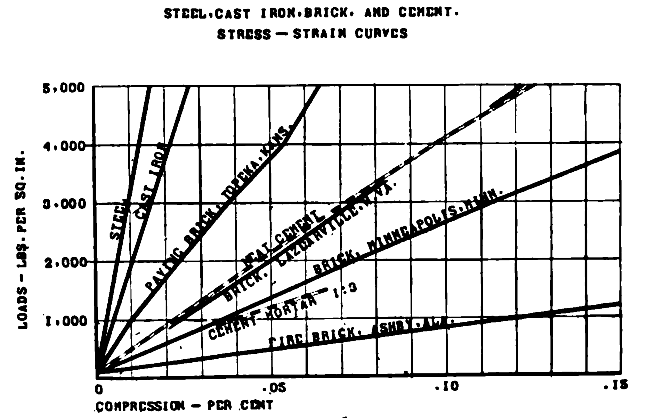


FIG. 6.

here plotted for reference purposes. A paving-brick from Topeka, Kansas, occupies a position next to the cast-iron and steel. Then follow the curves of neat Portland cement, a brick from Lazearville, West Virginia, then a brick from Minneapolis, Minn., and the curve of a cement mortar of one part Portland cement and three parts sand, and at the lower part of the diagram appears the curve of a fire-brick from Ashby, Alabama. This diagram shows the range in compressibility which may be met with ordinarily. The number of curves might be extended, but other grades of material would occupy places between the curves of the paving-brick and the fire-brick.

(No. 7) The strength of brick piers will now be referred to. Diagram No. 7 shows the results with piers made of hard, and

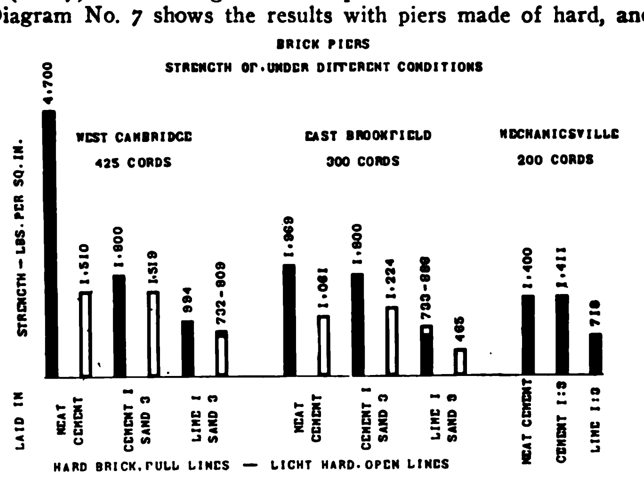


FIG. 7.

light-hard sand-struck brick laid in different kinds of mortar. Brick from three yards are represented, the amount of fuel used being 425 cords, 300 cords and 200 cords, respectively, per million brick. One grade only was received from the yard where the smallest quantity of fuel was used, which was classified as hard.

The range in strength from the hardest brick, laid in neat cement, to the weakest light-hard brick, laid in lime mortar, is

seen to be very great. In respect to the compressibility of the piers under loads, the difference is greater than shown by their ultimate strengths. It is desirable to use neat cement or a strong mortar in laying hard brick, in order to attain maximum strength and rigidity. Rigidity is regarded as an important factor in construction as well as strength.

Lime mortar should not be used, when either of the considerations just mentioned are essential.

Two values are shown for two of the piers. The brick from these yards were panelled on one side, and the higher strength in each of these piers belongs to duplicates in which the panels were filled with neat cement before laying.

(No. 8) Some piers made of water-struck brick appear on

BRICK PIERS - WATER STRUCK BRICK.

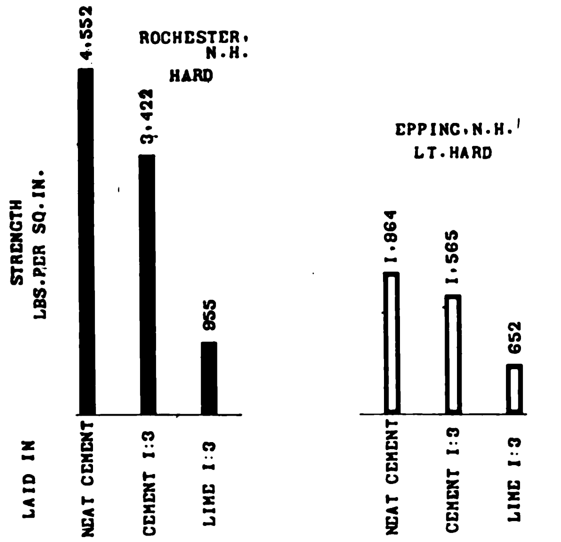


FIG. 8.

Diagram No. 8. One yard furnished the hard, another the light-hard brick. The influence of the mortar on the ultimate strength of the pier is again well shown. It seems a wasteful effort to use a weak mortar in which to lay a pier of hard, strong brick.

(No. 9) The curves of compressibility of some piers are shown in this diagram. An earlier stress-strain diagram (No. 6) showed corresponding results on individual bricks and other

BRICK PIERS
STRESS-STRAIN CURVES

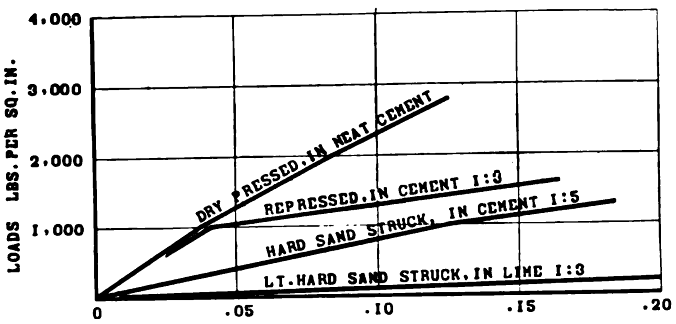


FIG. 9.

materials. On the present diagram the most rigid condition pertained to the pier made of dry-pressed brick, laid in neat cement. A pier of re-pressed mud brick appears next in the order of relative rigidity, then a hard sand-struck brick pier laid in less rich mortar than used for the re-pressed brick, and most compressible of the group is the pier of light-hard brick which was laid in lime mortar. The characteristics of these piers depend chiefly upon the quality of the mortar employed.

From this exhibit it may be seen how unfavorable is the action in a wall, the face of which may be laid with one class of work, while the backing is of another.

(No. 10) In order to illustrate the strength which may readily be attained in brick pier construction, the results of some strong piers have been brought together on the diagram now presented. The four piers represented on the right of the diagram are taken from earlier tests, the results of which are among the published records of the laboratory. The other six represent piers built and tested just prior to the time of this convention. These later ones were intended to be strong piers, a result which was realized in the tests. They were about 8 feet in height each, nominally 12

SOME STRONG BRICK PIERS
LAID IN NEAT CEMENT

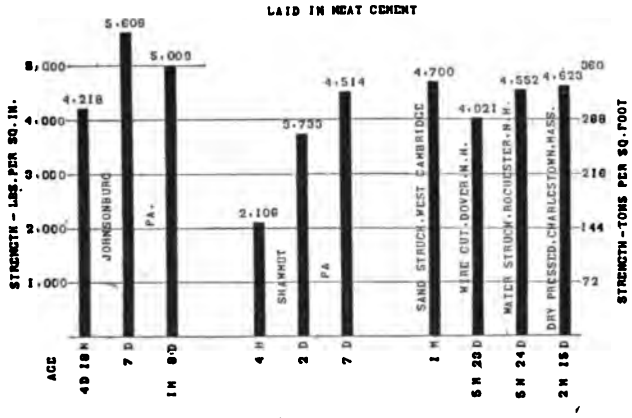


FIG. 10.

inches square; they had hollow cores, and the bricks were laid on edge in neat cement.

The ages of the piers are entered along the lower edge of the diagram. One pier, the youngest of the series, was tested the day it was laid. The test began about one hour after the last brick was in place, and was finished three hours later, or when the pier was four hours old. It developed a compressive strength of 2,106 pounds per square inch. The mortar had not hardened, and unusual compressibility was of course displayed. The total load on the pier reached 118 tons, a load far in excess of any which could be expected to be placed upon it in constructive work, at so early an age.

Horizontal lines represent pounds per square inch on the left of the diagram, and, on the right side, tons per square foot. One pier reached a strength of 360 tons per square foot, another exceeded this load. The allowable load prescribed by the building-laws of some cities is understood to range from 15 to 30 tons per square foot, which seems a very low limit in the presence of piers possessing the ultimate strength these displayed.

(No. 11) The stress-strain curves of one brick pier, two mortar columns and two wooden posts are shown on Diagram No. 11. These curves stand for strong examples of their re-

BRICK PIER, CEMENT MORTAR AND WOODEN COLUMNS
STRESS-STRAIN CURVES

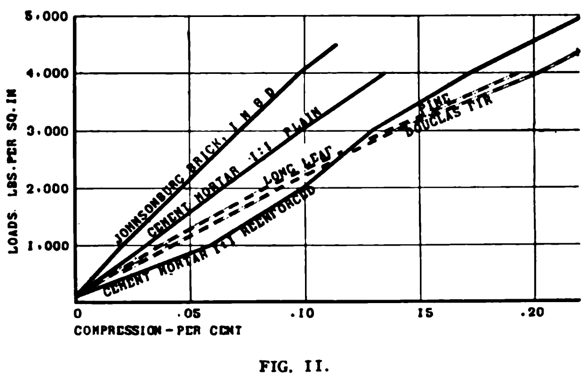


FIG. 11.

spective kinds. These illustrations and others which have gone before were selected, in many of the cases, to indicate what seems best in constructive materials: examples which could safely be followed where strong and safe construction is needed.

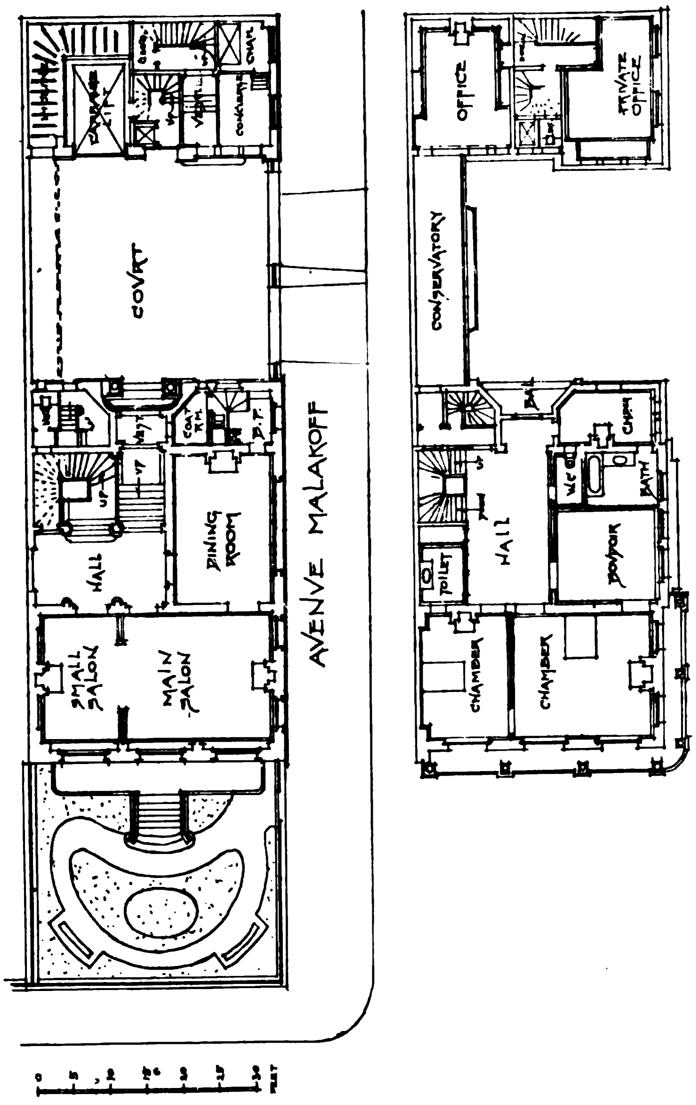
HOUSE ON THE CORNER OF AVENUE BOIS DE BOULOGNE AND AVENUE MALAKOFF, PARIS.

AS the stranger in Paris descends the Avenue Bois de Boulogne from the Étoile to the Bois, there are two houses that impress themselves unconsciously on his mind: one the great marble reproduction of the Grand Trianon, belonging to the Comte de Castellane; the other, the house directly opposite. And what

a contrast between the two! The latter, with its picturesque skyline of high, pointed gables and soaring chimneys, is as aspiring in its effect as its opposite neighbor is grovelling. Not that the Comte de Castellane's palace is commonplace, for a great deal of the exquisite charm of the original is retained in the reproduction; yet its single story and unbroken horizontality give it a peculiar aspect of inharmoniousness with its surroundings.

The soaring house across the street holds well its own amongst its neighbors, yet without losing its character as a private residence. And there is another striking difference between the two. The Castellane palace is Classicism carried to the extreme, while, on the other hand, its neighbor is one of the most interesting of the radically dissenting architectural treatments in Paris. Well it may be, for it is the result of many years of single-minded experiment and effort on the part of its architect, M. Charles Plumet.

It is instructive to follow the development of his ideas through three apartment-houses previously erected. The first, at No. 151 Rue Legendre is quite Gothic in its detail, yet with the germs of



his later marked individuality. The second at No. 67 Avenue de Malakoff, in brick and stone, shows more of a departure from the Gothic, but is still rather rudimentary in detail and is interesting only as a promise. The third, on the Rue de Tocqueville, just north of the Rue Legendre, is a decided advance over the second. Here the masses, *motifs* and details, all begin to assume more or less definitely the types that he has retained in his subsequent work. It is these types that he has developed with so much play of fancy and harmony of mass and proportion in the house which is the subject of the present note.

Before analyzing the exterior, let us see wherein its masses are dependent on the interior requirements. As is seen from the accompanying plans, the house is entered from a court opening on the Avenue Malakoff. To the left is the entrance-porch, beyond which is the service-entrance. To the right is a separate building, which provides for the stable and the concierge's rooms on the ground floor and an office and working room for the owner in the second floor. The two-story, glass-enclosed passageway along the party-wall, at the rear of the court, connects the two buildings.

The house proper is 39 feet 8 inches on the Avenue Bois de Boulogne by 57 feet 3 inches on the Avenue Malakoff. The plan is simple and quite practical. We enter through the stone vestibule, a feature of which is its beautiful opalescent-glass windows. A short flight of steps directly before us leads up to the main hall, 23 feet 3 inches by 16 feet. On the right is the main staircase, to the left the dining-room, and directly in front the two drawing-rooms, which may be used separately or together, as the occasion requires. These front rooms are 20 feet 6 inches deep. The dining-room is 16 feet 2 inches deep by 23 feet 3 inches long. The arrangement for domestic service, the separate entrance and stairway, the cloak-room and serving-room, is quite ingenious and worthy of note. The second floor, with its luxurious suites of bedrooms grouped about the large central hall, explains itself.

As to the architectural treatment of the interior, all except the vestibule was put in the hands of the furnisher, and so has nothing of especial interest for us. The vestibule, in stone, is a charming example of exterior *motifs* applied to the interior.

However, the real interest of the building lies in its façades. In order better to visualize this, let us study the materials and their color. The base is of a hard dead-white limestone called "*comblanchien.*" Above the base the stone is a buff-white limestone from four or five different quarries, yet similar in color and texture. The balusters are of glazed terra-cotta, a buff-brown in color. Similar blocks of terra-cotta are used in the checker pattern about the top of the chimney on the Avenue Malakoff. In the window arches, again, we find a similar buff-brown glazed terra-cotta. The façade on the court is principally in a buff-yellow brick. In the covered passageway across the back of the court, the ironwork is painted a sage-green and the bricks are glazed. The upper story is very open, serving as a conservatory, with a covering of glass tiles. The roof is slated, with all the valleys rounded. The woodwork and the conductors are uniformly of the same color as the stone.

The ensemble is satisfying in its masses and the details are full of movement. Many of the individual *motifs* are charming in themselves, as for example the high dormers and the quaint little balcony nestled about the chimney.

A certain harmony is gained by the use throughout of the same curve in the elliptical or segmental-headed openings. The detail is occasionally suggestive of Gothic, especially in the way the arches develop out of the tops of the columns. The column bases and certain of the mouldings exhibit, to a slight degree, Gothic influence. But in general the detail is the result of a most conscientious study of masses and light and shade. Notice, in particular, the play under the loggia of the façade, the gradual deepening of the shadow as the wall surface curves, relieved in just the right proportion by the brilliant blacks and whites of the consoles. Then the double band of gray white, a narrow band of intense shade, and then the brilliant band of white marking the loggia floor. This, again, is enhanced by the silhouette of the charming wrought-iron rail against the soft tones of the back of the loggia.

Another playful bit of light and shade and color is about the little chimney loggia.

In general it can be said that this house is one of the most interesting examples in Paris of individual architecture, because it is one of the most "arrived," and, in so far as long and conscientious training and study may count, it is one of the most successful.

G. B. Ford.

COMMUNICATIONS

THE COMPETITION QUESTION.

To the Editors of the American Architect:

Dear Sirs:—About three or four months ago the President of the Connecticut Chapter of the A. I. A. received a typewritten draft of a proposed code of competitions prepared by the Committee on Competitions of the A. I. A., and it was intimated that any suggestions would be welcome. Acting on this invitation, a committee of the Chapter was appointed to consider the matter, and the paper was returned to the Committee on Competitions with a few suggestions and several mental reservations. In sending this qualified approval of the proposed code, the members of the Chapter did not imagine they were endorsing the practical

disapproval of both open and mixed competitions, and a rather doubtful approval of any competition whatever.

The question of competitions comes up at nearly every convention of the A. I. A., but, like Banquo's ghost, it "will not down," despite all the efforts of the Institute to lay it. In reading over the report of the Proceedings of the convention of 1905, the discussion of this subject reminds one of Dame Partington's vigorous efforts to sweep back the Atlantic Ocean. "I need not tell you," Sidney Smith says, "the Atlantic Ocean beat Mrs. Partington."

There has been an effort made lately to eliminate from the game of football its objectionable features, not by abolishing football altogether, but by improving the rules of the game and insisting on their observance. If the game of competition could be conducted so as to remove its most glaring objections, instead of being a "necessary evil," it would be a bracing intellectual and artistic exercise, as beneficial to the architect's faculties as the game of football is to the physical development of the college boy. Where the spirit of competition does not exist there is sure to be intellectual and artistic torpor.

The drift of the proposed code of competitions seems to discourage competitions altogether; or, if that is not feasible, to limit them to a select few. "This," as Mr. Hale elsewhere observes, "is an admirable arrangement—especially for those architects included."

It savors too much of an architectural "combine" or trust, and is very properly regarded with suspicion by the general public, though but feebly opposed by those architects who do not belong to the magic circle. This principle of limited competitions, the *American Architect* says, "has of late years been extended, beyond reason, to include several competitions for large and important buildings where a general invitation would have been preferable, giving rise to a feeling which, though unexpressed save in a few instances, has yet become very marked, that a ring is being formed of a certain few men who are invited to participate again and again, while the rank and file, unknown but frequently of considerable capacity, are not given a fair chance." In the discussion of the report of the committee on competitions at the convention at Washington last January, it was evident that this feeling was shared by a majority of the delegates present.

Instead of making futile efforts to discourage competitions altogether, or to reduce them to their lowest terms by confining them to a select few, it would be far better to try to improve the present methods, and so guide the competition as to promote fair play and intelligent consideration.

The "compound competition" is even more objectionable than either the "limited" or the "mixed," for while it ostensibly appears to possess the supposed advantages of the "mixed" variety, it really deprives the great majority of those entering it of the possible reward of their efforts. It frequently happens in "mixed" competitions that the prize is captured by a competitor who was not one of the especially invited, and in some double competitions some of the paid men have been obliged to give place to comparatively unknown men of the rank and file on account of the superior excellence of their designs. In the compound competition the rank and file are deprived of this opportunity to demonstrate their ability to compete successfully with the paid men, for by this device, to "save their face," the paid men are assured of their position in the final trial, which they might have been unable to hold had they entered the lists in the preliminary tournament.

Another advantage they have is the possibility of benefiting by the ideas embodied in some of the designs submitted in the preliminary competition, and also of preserving their incognito, while the authors of those selected in the first stage to compete with them can easily be recognized by the assessors, if the same assessors judge both sets of designs, which would probably be the case. This objection was evidently perceived by the committee when preparing the terms of the compound competition for the City Library at Springfield, Mass. To meet it the programme naively says that, owing to the time elapsing between the first and the second stage of the competition (about one month) and the modified character of the designs, it would be very difficult to identify the designs of the winners in the preliminary competition!

Important public buildings, or other buildings of magnitude and importance, should have the designs chosen in open competition, with a fair field and no favor. This is the only kind of competition that offers to all entering it the assurance that they are not handicapped in the race.

It is asserted that men of light and leading will not enter open competitions, but this is disproved when we recall the open competitions for the Houses of Parliament, London; the Opera-house, Paris; the Berkeley University, California; the Peace Palace at The Hague, and many others, which were engaged in by a large number of architects of distinction. As was said by Mr. Coolidge at the last convention of the A. I. A., at Washington, the open competition is the usual method employed in European countries for public buildings.

Mr. Post, past-president of the Institute, admits that out of fifty millions worth of work executed from his designs most of it was captured in competitions, presumably in all the varieties of competition in vogue during the past thirty years, when architects were not quite so ready to lay down the law to building-committees as they seem disposed to be now.

If the "mixed" competition is discountenanced, the "open" competition barred, and nothing left but the exclusive "limited" competition, reserved for leading architects, or the "compound" competition—which amounts to practically the same thing, as it safeguards the position of the leading architects—the result will inevitably be that much important work will fall into the hands of practitioners whose motto is "the first principles of architecture is, to get the job."

If we hold aloof from entering competitions, the Harrisburg State-house scandal will be repeated over and over again, and architects will be helpless to prevent it.

Although direct selection is undoubtedly the most satisfactory method of procuring designs for small private work, it is an unwise course to adopt for public or other important buildings. Numerous instances could be given where it lent itself to unfair discrimination in public and private work, the appointment of an architect for the Brooklyn Public Library being one of the most recent cases of this kind. Notwithstanding the evil growing out of direct selection for public buildings, the A. I. A. still retains at the head of its "Code of Competitions" a note saying that the Institute does not recommend competitions. Let us hope that in the amended code this note will disappear, and one taking its place approving of competitions for all important public or private buildings.

In the open competition for the new Education Building at Albany, N. Y., to cost $3,500,000, all the requirements of an attractive and fair competition seem to be fulfilled, and it was engaged in by sixty-three architects or architectural firms. Whether there were among these sixty-three architects a fair proportion of the leading men of the profession is only known to those conducting the competition. Whether there were or not, the competition bids fair to be a successful one, and it is to be hoped that there will in the future be many more such.

George Keeler
Pres. Conn. Chapter, A. I. A.

[The "compound" competition does not "deprive the great majority of those entering it of the possible reward of their efforts" in any greater degree than any other form of competition. The compound competition is the only form of competition that deals equitably with conditions as they exist to-day, giving to each party to the transaction an adequate opportunity to arrive at the best result at the moment attainable. Theoretically, a wide-open competition with "a fair field and no favor" is the proper means to employ; but it is a valueless method when it is known that the most competent men will refuse to take part in it, the very men of whose abilities an instructed public should be most desirous to avail itself. Mr. Keller knows that the public is fully informed as to the attitude of these men, by their speech and private letters, by the publication of their remarks before the professional societies and by the pronouncements and recommendations contained in the A. I. A. "competition code." The public has quite as much common sense as have architects, and it knows that the aid of the most competent of architects should be of value to it. It is, then, hardly wise to advise the public to secure the designs for public buildings by open competition, knowing that by so doing it will deprive itself of the aid most likely to be of value to it. It seems to us that Mr. Keller, and perhaps others of our readers, quite misapprehends what a compound competition properly arranged really is, and we suggest that a re-reading of the explanation given in our issue for January 27, 1906, may be of service. It is quite immaterial that the compound competition may, as Mr. Keller alleges, "safeguard the position of the leading architects"; we have not given their rights much thought; if they really are leaders their own abilities should be enough to give them all the protection they deserve. We have been considering the matter of public buildings mainly, if not wholly, as simple individual, but instructed, citizens. If anything can be gained, we are quite willing to withdraw our assertion that the "compound" competition is a wholly satisfactory solution of the "competition evil," and will advocate the method on the ground merely that it is the most intelligent and equitable compromise of conflicting interests that has yet been suggested. At the same time, we feel strongly that there should not be, and really is not, any conflict of interests between the public and the profession.—Eds. "American Architect."]

February 16, 1907.

To the Editors of the American Architect:

Dear Sirs:—Since you have invited comments upon your issue of January 26, 1907, page 54, permit me to say concerning programme conditions, item 3, beginning "Honest," should have read the extreme opposite.

I have myself lost thousands of dollars in cases of competition carefully kept within the limits of cost and *announced as No.* 2 when the No. 1 was a fraud, both upon the public and the profession—proven so when the estimates came in. I remember your comments palliating the action of the Committee on the Meriden High School competition "to cost $20,000." That was twenty-four years ago! They called my design No. 2—the No. 1 design by a Springfield architect cost over $50,000 and I had most carefully studied to be inside of $20,000—and *was so.*

Believe me, honesty in this is the very foundation on which we work, and "no margin of variation indefinitely extended"—*not any for me.*

Then of item 4—The losses of failed competitions are a burden too heavy to be borne on any such voluminous programme!—it should be cut down more than fifty per cent. in any and every unpaid competition.

Several competitions to which I have been invited called for only two drawings—one plan and one perspective. All competitions should come as near as possible to this.

Yours,
A. B. Jennings.

[In comment upon our correspondent's objections, we will say that although, in the case of the "New Theatre" competition, the competitors agreed amongst themselves in consultation over the preparation of the programme that it was desirable to furnish about the number of drawings we name, the jury, one member of which was the late Stanford White—a practising architect, one having some slight experience in understanding a design and appraising its value—declared that several other drawings must also be provided.

Our correspondent seems to take the ground that it is proper to award, say, one million dollars' worth of work on the evidence afforded by one hundred dollars' worth of drawings, not because the evidence is complete and satisfying, but because one hundred dollars have been expended in preparing the evidence—such as it is. —Eds. "American Architect."]

ILLUSTRATIONS

HOUSE AT THE CORNER OF THE AVENUE BOIS DE BOULOGNE AND THE AVENUE MALAKOFF, PARIS, FRANCE. M. CHARLES PLUMET, ARCHITECT: TWO PLATES.

For description, see article elsewhere in this issue.

THE UNIVERSITY OF BUFFALO, BUFFALO, N. Y. MR. GEORGE CARY, ARCHITECT, BUFFALO, N. Y.

MAIN ENTRANCE TO THE SAME.

SCHLOSS BURRESHEIM, IN THE EIFEL, PRUSSIA: TWO PLATES.

These illustrations of an interesting building which dates from the fourteenth to the sixteenth century are copied from *Blätter für Architektur.*

THE TWENTIETH CENTURY CLUB, DELAWARE AVENUE, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

HOUSE OF REV. W. R. TAYLOR, ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

Additional Illustrations in the International Edition.

TOMBS.—PLATES 41-48.

NOTES AND CLIPPINGS

Public Weather Towers in Vienna.—In several of the beautiful parks of the city of Vienna very interesting weather towers or booths (Wetterhäuschen) in the shape of a pagoda can be seen. In the Maria Josefa Park, just opened, is one which is distinguished from most others by the number of meteorological instruments, and by very full data and indications of general interest. It was made by Heinrich Kappeller, from a design by Ignaz Fuchs. On the front is an ingeniously constructed universal clock, designed and patented by Professor Lauda, of Leitmeritz, and made in Vienna. The clock shows the time in all the large cities of the world. On the northeast side is an immense atmospherical thermometer, showing the temperature of the moment, while another beside it gives the extremes of the 24 hours past. On the northwest side is a new instrument, namely, an electrical barometer, which gives warning of impending electrical storms. Beneath it is a meteorological telegraph instrument, and from these two weather-prophets reliable conclusions can be reached. On the southeastern side is a self-registering barometer, by which the variations in atmospheric pressure for an entire week are recorded on a strip of paper. On the southwestern side are two self-registering thermometers, protected from the sun. One shows the variations in the temperature of the atmosphere, the other changes in a stratum of earth beneath the booth some eight feet deep. The remaining space is filled with interesting meteorological data. The booth receives much attention from visitors. The idea of combining the useful with the ornamental is a good one, and might be followed to advantage in our public parks.—*Scientific American.*

To Complete Roman Excavations.—The municipal authorities of Rome are preparing to complete the excavations of all ancient monuments and ruins in the large parks which form what is called the "Archæological Promenade." The project has been intrusted to Professor Boni, who is director of the excavations at the Forum.

New York City's Foundation.—Some curious facts about the rocky ledge on the shelving slope of which lower New York, with its millions of tons of skyscrapers, teeters have been revealed by engineers who have been boring hundreds of feet below the surface in connection with building plunger elevators for the skyscrapers. At Rector and Church Streets, under the United States Express Company Building, the rock ledge is forty feet below the surface, while just a few hundred feet to the northeast it is sixty feet. Going uptown, the ledge is one hundred feet down under the old *Times* Building, and reaches the greatest depth yet found, 150 feet, at the southeast corner of the *Tribune* Building. At Thirty-fourth Street and Fifth Avenue, where plunger elevators have been constructed for the Waldorf-Astoria, the ledge comes to the surface. The ledge is harder over the East Side of the city, and gets more chalky and crumbly toward the Hudson River. The rock also grows softer in all the borings as the depth increases. In one or two cases the bores have reached cavities in the ledge at a depth of about 200 feet which were from twelve to fifteen feet deep. The deepest holes made have been 345 feet. under the Carroll Building in West Street. Under the Trinity and Boreel buildings twenty-nine borings were made, averaging about 300 feet. From one of these the largest solid core of rock ever brought up was recently taken from a depth of nearly 300 feet. The core was twenty-two feet long and sixteen inches in diameter, and weighed 2,750 pounds. The rock was a gray freestone.—*N. Y. Tribune.*

Big Ship Canals of the World.—The following figures, published a year or two ago, give an idea of the size, cost and time of completion of the principal ship canals of the world:

	Suez.	North Sea.	Manchester Ship.	Chicago Drainage.	St. Lawrence group.	Corinth.
Total length (miles)	99	61	35	28	73	4
Depth (feet)	26	29½	26	22	14	26¼
Width at bottom (feet)	72	72	120	110	100	72
Number of locks	..	2	5	..	48	..
Total rise of locks	..	Tidal	71½	..	551	..
Length of locks	..	..	600	..	270	..
Width of locks	..	..	65	..	45	..
Excavation (cubic yards)	99,400,000	104,630,000	53,500,000	40,000,000	..	..
Total cost	$93,000,000	$39,000,000	$65,400,000	$28,411,920	$85,342,000	$9,500,000
Cost per cubic yard	93 cents	37 cents	$1.22	71 cents	..	..
Year of beginning	1859	1887	1887	1892	..	1882
Year of completion	1869	1895	1893	1900	..	1893
Years in building	10	8	6	8	..	11
Maximum number of men employed	25,000	10,000	17,000	8,000	..	..

The American Architect and Building News.

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THE hearings that have been going on before the Committee on Mercantile Affairs of the Massachusetts Legislature upon the proposed bill to fix a height-limit for buildings (outside of Boston) throughout the State, interesting as they are, merely emphasize the difficulty of reaching a reasonable, if not wholly equitable, solution. Ranged upon one side are arguments founded absolutely upon dollars and cents, and opposed to them are arguments that are based on several different and quite intangible assumptions. The attack, that is, is concentrated, while the defence is scattered and weakened. But Dr. Philip Kilroy, of Springfield, discloses a line of argument which makes it possible to marshall the defence upon a single field, and that field the one already occupied by the attacking forces; that is, he offers a common measure by which the opposing arguments can be weighed and compared, a measure, too, that is strictly a commercial standard. Briefly, he alleges, with supporting proof, that high buildings are inimical to health, and he asserts that "it is a commercial asset to have health," and here we have at once the same sort of dollars-and-cents measure that the opponents of the bill seek to apply. Now, if the supporters of the biil could go farther, and take a leaf out of Professor Breckenridge's book, they should easily prevail. A week or two ago, Professor Breckenridge, while reading a paper before the City Club on "The Commercial Possibilities of a Smokeless Chicago," produced, as mute and terrible witnesses to the soundness of his contentions and the genuineness of his own earnestness, a number of jars containing the lungs of deceased Chicagoans, the exhibit showing that the lungs of an adult citizen who had lived long in the city were about as black as those of a coal-miner. With time and thought, the doctors, physicists, botanists and bacteriologists could get together as convincing an object-lesson for Massachusetts as was afforded in Chicago by those carbon-loaded pulmonary passages, an exhibit that should make short work of the dollars-and-cents argument.

MUCH impressed by the old-time aspect of the city, a writer in some Western newspaper, who had not then seen the report of the Boston Society of Architects, to which we referred last week, recently declared that "the whole country would rise up against any attempt to Haussmannize Boston," and we feel that such a protest would be thoroughly justifiable—if Buda-Pesth were to be accepted as the all-desirable model. While a certain amount of reformation and modernization is needful, and for that reason desirable, it seems to us rather singular that amongst the many suggestions made by the Boston Society of Architects there should be none that suggests the desirability of reclaiming to public use and enjoyment some part of the harbor frontage of the city proper; and this is all the more singular because half the members of the reporting committee are old enough to recall the enchanting panorama that was revealed to an astonished public when the great fire temporarily opened up the water-front to its view. At that time Baron Haussmann, if in Boston, would have given the State-house a quarter-turn, and then have cut an avenue through the ruins to the water's edge, finishing there with a plaza of moderate size. Baltimore, since its fire, has done a little something to improve its harbor front; Chicago still fights to preserve its "Lake-front;" New York remains loyal to Battery Park and has added to it the splendid Riverside Park. But Boston has parted with its chief birthright, and Bostonians of to-day, not realizing what they have lost, might, for all the joy of living that Nature affords them, as well be inhabitants of Worcester.

AS will be seen by the report elsewhere in this issue, the jury of award on the recent architectural exhibition in Philadelphia makes a strong, but, as we think, a mistaken plea for the hanging of plans explanatory of the elevational drawings and photographs exhibited. If the recommendations should be modified so as to require exhibitors to send-in plans to the hanging-committee, leaving it discretionary with that body to hang them or not, we believe the recommendation would accomplish all that is desirable, for we feel sure that very few [scale] plans would be hung. The matter has been threshed out again and again by different committees in many countries, and it is now generally accepted as proved that an architectural exhibition to be successful and popular with the public, and, so, of real commercial use to the exhibitors, must be almost wholly pictorial in its nature, and that the higher its technical merits are from the professional standpoint,

the less is it able to draw the public. The superficial area of most plans is out of all proportion with the area required by the other drawings of a set, and it is unreasonable that wall-space should be consumed needlessly, for it is only about one plan out of ten that is something more than a perfectly obvious and uninteresting statement. Our objections lie, of course, only against scale drawings. We thoroughly believe, and perhaps this is what the jury intended to advise, that photographs and perspective drawings should always be explained by small sketch-plans, sufficiently enlightening for the purpose, but consuming a minimum of wall-space.

THE probable serviceableness of the explanations that may be found in another column as to the hazards that attend the use of refrigerating systems that involve the use of ammonia, is instanced by the serious mischance that happened last week in New York City. The first of the firemen to attack a fire in a burning butcher-shop were overcome by escaping vapor of ammonia, and still others succumbed during the attempt to rescue the first victims, the final result being that, aside from those temporarily injured, two firemen lost their lives through suffocation. The interesting facts are that not only was the fire itself a small one, and the shop and refrigerating-plant of only medium size and capacity, but the owner declares that the refrigerating system had not been in use during the last seven weeks of cold weather, and that the expansion coils were consequently empty. The accident proves, once more, that even after we succeed in building really fire-proof structures we must still maintain efficient fire-departments, and that the fireman's occupation will always involve a real personal peril.

THE justness of our prevision that architects and their clients might, at times, suffer annoyance and loss, because of the patents that have been placed on the various methods of reinforcing-concrete, seems to be borne out by the case of Mouchel *vs.* Cubitt & Co., recently disposed of in the Chancery Division of the High Court of Justice. The defendants, a firm of London contractors, had procured a license from the plaintiff, the sole and general agent of the Hennebique system for the United Kingdom, to execute reinforced-concrete work after that system in the town of London; it was, however, one of the stipulated conditions of the license that the defendants should not carry out any reinforcing work which should be "an infringement of said patents, or be in competition with the same." In spite of this prohibition, they carried out a small contract for reinforced-concrete after another system for a certain brewery, and, when brought into court, sought to justify their act by alleging that the limiting condition in the contract was void, because it was wider than was necessary for the protection of the plaintiff, and, further, that it imposed undue restraint upon the defendants' trade. Mr. Justice Neville ruled, however, that the stipulation was pertinent and granted the plaintiff an injunction as desired, pointing out, merely, that the words "at any time" in the temporal condition were of course limited to the duration of the license. The case is merely symptomatic, but it shows how contractors, to whom architects may have awarded a contract, may be prevented from carrying it out according to the specifications, because they have not a license to employ the method in question. In such case there is obvious danger that the contractor may seek to substitute, with the architect's consent or without it, some other method than that which the specifications call for.

ALL of us have, at times, had the spirit of combativeness stirred by the arrogant impertinence of some public or semi-public office-holder which receives its best, or worst, exemplification in the case of the theatre or railroad ticket-seller who, securely entrenched behind window and counter, sometimes vents his spleen and rests his racked nerves by inexcusable insolences. It is not usual, however, to find the same sort of irritation finding expression in written official communications, but that is just what stands out unmistakably in the singular correspondence over the Trenton city-hall competition, which was published in our issue for February 16, a correspondence which finds its closing word in another column. Architects will note that this is the only reply the committee deigns to make to the implied question as to the credibility of the rumor that the committee's own expert-adviser is to be allowed to submit a design for the building. In view of the fact that the original programme authorizes intending competitors to apply to the committee "for any further general information," the manner in which such information has been denied indicates that the committee lacks the prime essential of a deliberative and judicial body—fairmindedness, and that architects will do well to avoid them.

A CASE of some interest to architects, who have now and then to cope with the obstinacy of recalcitrant contractors, was recently decided in the Eleventh Judicial District Court for Texas. In 1904, one Koehler contracted with Applegate & Wilson to erect a brick building at Houston, after the plans of L. S. Green, at the cost of $20,159. Apparently, the contractors found the architect so exacting in his supervision that it was clear to them that they must lose money on the job, and so they began to take liberties with the specifications. On the architect's advice and in conformity with the terms of the contract, the owners in the following September instructed the contractors to surrender the contract and abandon the work, enforcing their demand by securing a temporary injunction forbidding Applegate & Wilson to proceed with the work. This injunction the builders succeeded in having dissolved, after which they proceeded to complete the building in their own time and with such modifications in material, arrangement and workmanship as suited them. Thereafter they rendered their bill for the full amount of the contract plus some fifty-five hundred dollars for extras, and on being refused brought the suit which is now decided against them, but only in part. On the evidence, it was proved and admitted that the owner at length received a building that was worth as much as the contract price, and the question turned on whether he must pay for the extras as well. As the owner succeeded in proving twenty-five variations and omissions, the bill for extras was cut down to three hundred and fifty-two dollars.

TWO LAYMEN ON THE OPPORTUNITIES OF AMERICAN ARCHITECTS.

ALTHOUGH the matter comes to hand a little belatedly, perhaps our readers will relish the following examples of after-dinner speaking which were called out at the "banquet" that formed one of the important features of the recent A. I. A. convention in Washington:

SENATOR HENRY CABOT LODGE: Mr. President and ladies and gentlemen, I suppose it would be useless for me to say that I am unaccustomed to public speaking, but I can repeat with truth that remark which was very familiar to some of us in our college days—that I am "not prepared." I have been speaking within the last two or three days, but the subject was a very different one from that which we have before us to-night. Brownsville, Texas, does not suggest architecture. I have tried, however, to get assistance, and I have had suggestions made to me. Mr. McKim told me anxiously that he was glad I was going to speak and asked me what I was going to talk about. I said, "Architecture, I suppose." He said: "Oh, don't talk about architecture—talk about architects." This, the Secretary of State was unkind enough to declare, was equivalent to saying, "Talk about something you understand." But if I should talk about architects, it is possible that my remarks might degenerate into a commination service, for, as you remember, when Lord Macaulay was a small boy, the nurse maid having disturbed a little garden which he had laid out for himself, he said: "Cursed be Sarah, for it is written that cursed is he that removeth his neighbor's landmark." I then asked my friend, Mr. Thomas Nelson Page, what I should say. "Oh," he said, "if you have not thought of anything, repeat the speech you made in the Senate the other day." I agreed with him it was a very good one, but I did not think it would do. I then asked Mr. Hopkinson Smith what I should say. He is to follow me, so it is perhaps advisable that I should say as little as possible on the subject. He said: "Say anything you please." Well, if I said everything I pleased about arctitecture and architects, I should take a good deal of time and grow unpopular. So I feel a little adrift, and I have thought that perhaps what I did say I might treat as a distinguished impressionist painter treated a picture when he showed it to a friend, who admired it and then asked, "What is it?" "Well," the painter replied, "I painted it as a sunset, but I have changed my mind since and I think I shall exhibit it as a portrait of my mother-in-law."

If what I have to say does not answer to the toast, why then we will simply call it something else. I shall disobey Mr. McKim's unkind suggestion that I ought not to talk about architecture. I shall speak of it—not from the professional point of view, but from the standpoint of a student of history, which I have been for many years in a humble way, because to me as a student of history architecture has been a great teacher. Ruskin, you know, in his book on "St. Mark's Rest," says that every nation writes its history in three books—the book of its Art, the book of its Words and the book of its Deeds. And in the book of its Arts there is surely none that is so full of meaning, to the historian at least, as architecture. For that embodies, if anything can embody, the soul of the people, and in the earliest records which we have of the history of man on earth we have to read that history very largely in his architecture. And the secret of all great architecture is that it should embody the national life, and should in its course exhibit the aspirations of the people. For it has a great permanency, and if it does not represent the people and the time, it is essentially a failure. If I may use an illustration which occurs to me at the moment, as I have looked at those wonderful Norman churches in Normandy, the Cathedral of Coutances for example, with that façade which still has the aspect of fortification, before the Gothic had fully developed, it seemed to me, I say, as I stood and looked at it, as if I could read in it the story and the aspirations of that wonderful race which came forth out of the dim mists of the North, with the clashing of arms, with their long boats, to go up and down over the face of Europe and make themselves kingdoms, from Scotland to Sicily, and from France to Russia. I seemed to read in those stones the whole story of that great fighting, building race of statesmen and scholars and prelates. And I think the same may be said of a great deal of the architecture in the world—of the greatest architecture, and that which the historian, at least, best loves to study. It is that which we must have here, if we are to have a great architecture, as I fully believe we shall have, and as we are developing it now it must be one that represents us. I do not mean that we must go to work to invent something which is wholly new and strange, which the world has never seen before. The forms of architecture are old, and not likely to be much changed. The secret of success lies in the application of the old forms to the conditions of the people who use them.

We have here a new country, but we are not a new people. The people who first came upon this Atlantic coast and started those little settlements which have grown into the United States were the representatives of an old civilization; they were the heirs of the ages, and here their problem was to apply the forms in consonance with what the new country, with its new aspirations and its new desires, demanded. That is one reason, I think, that we find what is called the Old Colonial forms are, as a rule, so agreeable, because the colonists took the forms of English architecture, the simpler household forms to which they were accustomed, and applied them to the purposes of the New World. They did not merely imitate; they did not merely try to reproduce something which had no connection with its surroundings, which was not of the soil, but they tried to apply the forms which had been tested elsewhere in a way to make them represent the New World in which they found themselves. The Greeks and the Romans, despite the fact that the Greeks produced the most wonderful art and literature which any people in the world have ever produced, developed a civilization which was largely an economic one. Our civilization is pre-eminently an economic and commercial civilization, and the forms to which we should naturally turn for application here are forms congenial to a civilization of that kind, and not the forms which represent an age of faith and force. We have applied these Classic or Renaissance forms here and with success. I think it must always be a gratification to every American, whatever may happen hereafter, that we can always point to the Capitol in this city, to show that we had a succession of architects who understood at least the purpose for which they were working, and who have left us something at once noble and permanent.

We are working in new forms to meet new conditions. If I make a mistake in what I am now about to say, you will set it down to an error of taste. But I never pass under the Brooklyn bridge, especially at night, without thinking that that great bridge, dependent from its piers, is a splendid piece of engineering and architecture, which belongs to our time and represents our feeling and meets our needs. It is a confession of age, perhaps, to say that I remember the first skyscraper, but that first appearance of the skyscraper struck me as something abnormal and rather dreadful. I have come gradually to the conclusion that this hostility was simply because it was new. It takes a long time to get accustomed to anything which is new, and we are very apt to think that because something is new that therefore it is bad. I do not mean to say that all skyscrapers are good, and I think the examples we meet in Washington, a city which has some beautiful public buildings, of really fine architecture, a city of large spaces and of indefinite room for extension, I think these scattered skyscrapers which we have here are little better than blemishes on the general aspect of the city. I wish we could have some law here as to the height of buildings, for I feel that Washington is not the ctiy of any one of us—it is the city of the whole country; it is the one city in the United States that is not, and never can be, local. I think it is the common interest of every one of us to do all that we can to make this particular city beautiful, and as a member of Congress, charged in a certain degree with the welfare of Washington, I feel a deep debt of gratitude to Senator McMillan, who is now dead, and who, with Mr. McKim, Mr. Burnham and the rest, laid out a foundation so wisely that in all that we do in Washington we can proceed on an intelligent plan, so that we shall not erect buildings here and there, but we have a scheme on which we can work, and which we can carry out—a great plan which would open the park from the Capitol on to the Washington monument, and so on to the driveway and the greater park lying outside the city.

Not being "prepared," I have been led into a digression on Washington. I will return, then, to the skyscrapers in New York, where there was a necessity, on that narrow island where the only space to expand for the room necessary for the business of the city was upward. Mr. Wells, the English novelist, who was here a year ago, when he went away said at the close of his last paper that, as he left New York, it looked like a collection of packing-cases set on end. Mr. Wells was still entangled in the delusion that what is new is necessarily ugly. Mr. Charles Whibley, another Englishman, also a distinguished writer, who has been here still more recently, has likewise given in his verdict. I read a paper of his in *Blackwood's* not long ago. When he

went away, he said, he could not exactly define what it was about New York that struck him, but he was convinced that it was very impressive, and he was certain that there was being worked out there something in the way of architecture and building which the world would one of these days greatly admire. Now you have two opinions, both quoted from—I won't say foreigners, but not from citizens. Certainly there can be no domestic bias in either opinion. And it seems to me as I come occasionally up the harbor, that the multiplication of those great buildings which look as if they were huge towers gathering together as you see them in some Italian town have a great impressiveness about them, and I believe that when it is all complete it will be one of the great architectural effects of the world. I do not mean to say that there are no mistakes and no ugliness and no crudities, and I know very well it is all unfinished, but I do believe that we are working out and applying the old forms to our new needs in a new way, and I am certain that this is the true road to follow.

I am sure that nothing is more important to our national life, nothing can express that national life better and more permanently, than the architecture of the country. Any individual man can do but little in that direction, but there is one thing we can all join in doing, and that is in leading and helping the Government itself in erecting buildings all over the United States which will be a joy instead of a sorrow to those who come after us.

The United States is the great builder. Congress, I think I may say, is anxious to do what is best, but Congress, with the multiplicity of things pressing upon it, cannot give proper attention or consideration to any one thing, unless the people and those outside who take an interest in it will press what is right upon them. Don't regard Congress or the Government as merely tasteless people who don't care whether a thing is ugly or not. They are just as anxious to make the architecture of this country fine and permanent as anyone else. They can have no other purpose in mind. But it is to you, gentlemen, who have shown so much interest which has had such good effect of late years that we must look for the assistance. Do not weary of well doing. I am sure that though the progress may be slow, both the progress and the advance are undoubted. The Government today builds better buildings than it used to build. There are better standards, there is a desire to have better buildings and good buildings everywhere. Let us make them representative of the national life and of the best aspirations which we have. To do this you must help those of us who are temporarily charged with the work of government. You must help us to carry the great expenditures of the Government into the right path, and then if you do you may be certain that in the end you will have Government buildings like the Capitol and you will set an example in all parts of the country which cannot do otherwise than improve the taste and the architecture of the people of the United States.

Mr. Owen Wister: Mr. President, ladies and gentlemen, have you ever had the forlorn experience of traveling by land between New York and Boston on the New Haven Railroad? However—that does not come in just yet. I shall come back to it because I cannot keep it out. In attempting to make some response to your double subject, Mr. President, I find myself a good deal in the predicament of a young man who wrote a book and took it to Thomas Carlyle and asked him to read it and to make some criticisms. Mr. Carlyle did read it, and he did make some criticisms, and this is what he said: "Your book contains much that is new and much that is true. But the trouble is that what is new is not true and what is true is not new." It is impossible to say anything true that is new about such subjects as literature and music. And, I will add, all the other arts, too, because they are all absolutely the same thing when you get to the bottom of them, and they simply differ in their formulation. If you take an art, no matter what it is, you will find that it expresses what I shall call plastic symmetry, the art of a people, the science of a people, a people's aspiration, a people's deeds, a people's customs, a people's view of life—that is what any art must always express through its special vehicle, and the vehicle is always plastic, although that word has been confined to one or two arts. But I assure you that color and sound and words are every bit as plastic as stone or marble, and it makes no matter whether it is the Apollo Belvidere, or the Temple of Vesta, or the Angelus of Millet, or the Merry Wives of Windsor of Shakespeare, or the *"Scarlet Letter,"* or whether (and I must put in a skyscraper, whether it is considered by you as art or not) it is a successful skyscraper that expresses the science of a people; they are all the same. Almost all great art is indigenous. It may be, sometimes, that a Browning can sing of Italy, or a Keats write about a Grecian urn, but to succeed an artist must express the essence of a people in some way or other. I don't suppose that anything could be more German than Goethe's *"Faust,"* and the reason it is universal is because any art that is deeply indigenous transcends its own frontiers and is understood and acquired by the rest of the world. When Goethe tried to write *"Iphigenia,"* he tried to write something Greek and did not succeed. That is merely the failure of a great man. Who in this room would prefer that Saint Gaudens had made, let us say, an Apollo Belvidere or a Hercules rather than an Abraham Lincoln? No, gentlemen, art must, essentially, always be indigenous and of the soil. It must be, in a great sense, what we call "wine of the country."

Now, everything I have said is perfectly old, and therefore I hope perfectly true, and out of the general haystack of knowledge I shall only pull one or two straws for your consideration. And I think I shall take first the Monroe Doctrine, which can be applied politically, and can be applied intellectually, and when our Government puts a tariff on fine arts, almost prohibitive, so that a Raphael, for instance, cannot be introduced by a private person except by paying a heavy fine, our Government is misapplying the Monroe Doctrine in the intellectual world. It was very natural, indeed, that we should want to protect certain things and it is natural that we should still want to protect them. But you must not keep from our republic the empire of Beauty. In keeping it out you simply impoverish us. I do not know whether this is familiar to you all—you certainly knew it once—architecture is frozen music, consequently music is molten architecture; and I shall talk about them all at once, because the arts are all one, and everything that you say about one applies to all the rest. What we call Independence Hall, in Philadelphia, where the Declaration of Independence was first read—do you know the name of its architect? His name was Andrew Hamilton. He was very clever, had good taste, had designs to study, and he made by care and prudence a perfectly respectable building. Nevertheless, I do not think it is a good thing to go, as they did in Boston, not to the specialist for what they wanted, but to an outsider. In the middle of the century, in Boston, there was a gentleman whom I shall call Mr. B——. He is now dead. And he had an uncle, and the uncle had been to Europe. Few people had been there in those days—it was in 1820—and the uncle had seen the Parthenon, and this and that and the other buildings in Greece, Italy and England, and when he came back to Boston he was supposed to know about building, so that whenever the Bostonese wanted a house or a public institute they went to Mr. B.'s uncle. Now, at that time Boston had Bulfinch; but that made no difference, they went to Mr. B.'s uncle. This habit of going, not to the specialist, but to someone outside, applies sometimes even in the medical profession. It is ingrained in the American people. I hate to generalize, for with eighty millions of people you will find every kind of thing going on, but a great many of the eighty millions are not inclined to go to the masters in any profession, but to somebody outside, who will give them something cheaper. That spirit, I am very sure, gentlemen, is passing.

It is natural that when we were young people, colonists in fact as well as in mind—when our imagination and association reverted to the mother country—it was natural that we should go to the mother country for all those forms of plastic art which they had there, and which we had not yet, and bring them over. It was natural that our early buildings should be Classical, it was natural that Greece should suggest to our republic some of our buildings, and it was most fortunate also. At that same time it was natural that Charles Brockden Brown, the first novelist of this country, should imitate the English novelists of his time and write such horrible romances as Mrs. Radcliffe had made popular. He was a pioneer, and he went to the mother country. So also it was natural that poets should use expressions borrowed from the English landscape and literature rather than that they should look here and talk about the chikadee and the Bumblebee, as Emerson did. Indeed, he was looked upon, when he first did it, as a skyscraper. It was most natural that the pioneer of all our most serious music, John Knowles Paine, my dear and honored professor at Harvard, in composing symphonies, should look to German models—he could not get better ones. He did not think of the American climate, or the music that comes from the African race. Now we have men like McDowell, whose work-days may possibly be over, but who has done enough to make him famous. We have men whose music has foreign recognition, music which could not have been written anywhere but here. These men do not make their music as the

California winegrowers made their wine. When they made a wine that was red they called it claret, and a white wine they called sauterne; when it was a fizzy wine they called it champagne. Calling the California wines by French names made them seem bad, but if you treat them as native wines they are quite good.

I have kept literature to the end, because you know of that far better than I do, because literature to-day, under our great masters, is steadily assuming American characteristics; also it is indigenous, and it is expressing, just as our poetry and our paintings are expressing, the essence of our people—just as a skyscraper will express it beautifully, I am sure. (I think that so far the engineers have solved their problem in the skyscraper perhaps a little better than the architects have done.) Now all these things go to show that we are getting to have an art which is indigenous, something expressing in plastic symmetry the essence of the American people.

Now I will go back to the New York and New Haven Railroad. I have a small "muck-rake" in that direction. There is no use in shouting that things are as good as they can be, when there is not the slightest ground for doing so. That is not optimism; it is merely moral paralysis. If anybody in this room has ever had the deplorable experience of traveling between New York and Boston and has looked out of the window, he has seen the product of the jig-saw period of American architecture. All along the line you can see the contemptible private houses of people who could well have afforded a better thing, if only someone had told them how to get it. But many of the American people have a voracity for the hideous. It spreads over the entire country. Now, appearances are a great deal. Foreigners visit us, and first they look at the visible thing. They don't inquire about our music or poetry. They may ultimately do so, but they look at us as we look at strangers. If we see a man with his hair nicely brushed and his nails clean, and a clean tie, and his boots brushed, we think favorably, at first blush, of him. But if his nails are dirty and his feet muddy, we judge against him. Very well, let us consider the appearance of our country as shown in the dwellings of its population. Let us consider how far we have wandered away from the old Colonial forms that were indigenous, and got to this contemptible jig-saw architecture. Here comes in your part. The literary fellows and the musicians can do nothing about this, but you fellows of the Institute can. Gentlemen, the appearance of our country lies in your hands. A man can do nothing without the people behind him; but the people can do nothing unless they have a man they can get behind. Gentlemen, it is your particular task of citizenship to make the appearance of your country presentable and civilized.

THE HAZARDS OF THE AMMONIA SYSTEMS OF REFRIGERATION.[1]

THE hazards of an ammonia system [whether "compression" or "absorption"] that may be attributed to the refrigerating media are few and not very serious, whereas the other hazards that may be present are those due to physical conditions under which they are found, and not due to the use of ammonia, as will be shown later on.

Let us bear in mind the physical properties of ammonia which may be summarized as follows:

Ammonia (NH_3) consists of one volume of nitrogen and three volumes of hydrogen and is the only compound of these two elements known to exist. When pure it is colorless, an irrespirable gas having a pungent odor and a burning or caustic taste. It is lighter than air and a gas at ordinary temperatures. Under atmospheric pressure it liquefies at 28.6° below zero F. and solidifies or freezes into a transparent crystalline mass at 115° below zero F., in which state it is almost odorless and is heavier than its liquid. It can be liquefied at higher temperatures (up to 266° F.) by increasing the pressure, so that at 86° F. it requires 170 pounds' pressure for liquefaction. Anhydrous ammonia is the name for that used in compression systems, and, as its name implies, contains no water. Ammonia gas is poisonous (irrespirable) and an atmosphere containing one-half of 1 per cent. is considered dangerous.

Anhydrous ammonia is manufactured by a purifying process from the ammonia liquor obtained from gas and coke plants, where it forms one of the by-products of the plant. Even that which is manufactured by one of our large packers here is made in this way and not as is commonly supposed from waste products of the packing-house. Manufacturers of anhydrous ammonia have reached the highest degree of perfection; less than fifteen years ago ammonia with 2 1-2 per cent. of impurities was considered amply pure for refrigerating purposes, whereas at the present time the impurities to be found are nothing more than traces that almost defy detection, and a drum of anhydrous gas that would show 1-100 of 1 per cent. of impurities would be discarded; each drum as filled being weighed and tested. The liquid gas is forced into steel drums, which are tested to 1,000 pounds pressure and are about ten inches in diameter and four feet long for fifty-pound size and seven feet long for 100-pound size, one manufacturer putting out a drum of 150 pounds' capacity. These drums are not completely filled, there being space about 20 per cent. of the volume for the expansion of the gas due to the change of temperature.

Ammonia is not combustible and a flame is extinguished if plunged into the gas. In a liquid form it will extinguish a flame in the same manner as if water were used. If a flame of sufficient heat is applied to a jet of ammonia, the hydrogen due to decomposition in presence of oxygen burns as long as the flame supplies the heat for decomposition, and as long as an atmosphere of oxygen is present to support combustion. The writer has verified most of these assertions, making his experiments with the liquefied gas as taken from several drums at the factory, a blow torch held across the stream of escaping gas from a drum was almost blown out, and when gas escaped with less force it blew a hole through the flame. In this, as also when a torch was applied to the outer edges of the stream of escaping gas, it was only with an interrupted, weak and flickering flame that the disassociated gas would burn.

Ammonia in air or mixed with air is not explosive. If mixed with pure oxygen it may be ignited and burns with a pale yellow flame, and, as claimed by some authorities, if mixed in proportions of four volumes of ammonia and three volumes of oxygen it becomes explosive if ignited by a spark or flame. Ammonia in combination with chlorine or iodine forms explosive compounds, but are of no interest to us at the present time. Like any other gas, if confined in steel drums and temperature raised sufficiently the pressure of the expanding gas will rupture the drum.

Ammonia does not attack iron or steel but rapidly attacks and corrodes copper, brass, nickel or any of their alloys. For this reason, in all ammonia systems piping and fittings are made of iron, steel or semi-steel, lead gaskets being used at the unions.

In the ammonia compression system the pressure from compressor to the expansion valve ranges from 125 to 170 pounds under normal working conditions, though in warmer climates it reaches 220 to 250. From the expansion valve back to the suction valve of the compressor the pressure seldom exceeds 30 pounds. We will, therefore, start at the compressor where the pressure is created and follow the hazards as they occur in the cycle of operations.

The compressor is usually driven by a steam-engine which necessitates a steam-boiler plant, the hazards of which are too well known and not any different from that of any other steam plant. This also applies to any other motive power that might be used, be it electrical, gas or water power, *i.e.*, the motive-power hazard is not altered because of the fact that it is used to operate a refrigerating system. The compressor cylinder is lubricated by sight-feed lubricators, little lubrication being required, especially in wet-gas machines where they depend only on the small amount of oil introduced by the piston rod. One system referred to later uses injected oil in the cylinder for other than lubricating purposes. The lubricating oil used is a paraffine oil of light color, one that will not saponify, will not congeal above 0° F., and has a flash point above 360° F. This lubricating oil, even in small quantities, is carried over with the hot gas to the oil trap nearby, where the oil is separated from the gas, falling to the lower part of the trap.

This oil has always been regarded as a hazard of some importance, since the presence of an open flame in years gone by when a cylinder head was knocked out and an explosion occurred, presumably from the oil that was atomized, which is possible, but which no doubt was caused by the impurities contained in the ammonia gases, consisting mostly of ethers. However, the recommendation of removal of open lights near the compressor or oil trap is not a severe one, especially in these days when the incandescent electric light is so universally used in and about engine-rooms. The gauge glasses on the oil trap and ammonia receiver are all provided with automatic ball stops that shut off the gas if gauge glass should break. The oil trap in some in-

[1] **Extract from the Report of the Committee on Special Hazards and Fire Record of the National Fire Protection Association.**

stances has an auxiliary attachment called an oil separator connected with the suction side of the machines to facilitate withdrawal of oil from trap without loss of ammonia.

Quite recently manufacturers are seeing the importance of and providing an automatic valve check in the exhaust pipe of the compressor, which prevents the entire charge of ammonia gas escaping should something go wrong with the compressor. This should be required in all installations and mounted either directly above the valve at the compressor or between the oil trap and the condenser, thus automatically shutting off all ammonia in condenser and liquid receiver, which may amount to 50 per cent. of the charge. There is practically no hazard from the oil trap to condenser and back to the liquid receiver. At the condenser a small cock is provided for drawing off air or other inert gas that might be in the system but forms no hazard. There are traces of oil that get past the oil trap which in some installations are taken up by an auxiliary oil trap at the condenser, in others at the liquid receiver. An engineer who is ignorant or careless might let his trap get too full, in which case it would pass to the liquid receiver, and even go beyond to the expansion valve, where it would settle in the well at the bottom of the riser. Beyond the expansion valve the pressure seldom exceeds thirty pounds, and in freezer rooms runs as low as one pound or even less. The hazards are nil, for a break in this part of the system, even with an ordinary open flame near at hand, would not cause an explosion or fire; if anything, the gas would extinguish the flame depriving it of oxygen. Of course, the presence of ammonia might retard the action of the firemen, but not very long, since the water thrown on the fire would soon absorb the gases, carrying them away.

The hazard of having a gas in a confined space at high pressure, without a safety-valve, is one that we find at the tanks in which the anhydrous ammonia is delivered. And yet, at ordinary temperatures there is but little danger. If fire occurred near one of these drums the pressure would increase to a point where drum would rupture, causing an explosion. These drums, where supply must be kept on hand, should be stored in one of the cooling rooms and not left in a warm engine or boiler room, or even exposed to the hot sun in tropical climates. The hazard of an explosion due to liquefied gas in the ammonia receiver is not very great, owing to the open system back to condenser, and in other directions to expansion coils. In case of fire near the receiver, the liquid would vaporize and go to a cooler portion of the system, except in a general fire, where the temperature would increase the pressure and cause a rupture at the weakest point in the system. Another condition where a considerable increase in pressure might cause a rupture in the system would be where, through some accident or error, the condenser water was shut off, when the pressure would increase as the temperature rises, due to heat of compression, a condition the writer has never heard or read of where the engineer did not discover such derangement before any serious accident occurred. Of course, they might provide a safety-valve with vent to the outside to meet such contingencies, but, so far, the manufacturers have never found it worth their while to consider.

In the absorption system the hazards are even fewer than in the compression system. Steam is used in the generator, exhaust steam being used in the smaller installations, forming the ordinary steam-pipe hazard. There is no oil in the system, and the one condition under which decomposition of ammonia might take place would be if the strong liquor were not supplied fast enough to the generator, allowing the gas above the liquor in the generator to come in contact with the steam pipes. This is provided for by the installation of an automatic float valve, which controls the height of liquor in the generator. If some of the gas were disassociated into the hydrogen and nitrogen it would be retained in the system and it would not be long before the engineer would discover it.

The hazards of the carbon-dioxide systems are somewhat lessened by the fact that the gas is not inflammable or explosive and a good extinguisher of fire when confined at the fire. Nevertheless, the excessive pressures might cause explosions which indirectly might be the cause of fire, such as the breaking of gas-pipes, electric wires, etc. In this system the lubricating-oil hazard, if anything, is increased owing to the high pressure.

As to the hazards in the various systems of utilizing refrigeration, whether by direct expansion, brine, indirect air blast or suction, sheet or other systems, the hazards are not any other than the same conditions and arrangements of apparatus would produce if used for other purposes, *i.e.*, a motor hazard would not be altered, because the motor drives a fan that blows air over refrigerating-coils, or operates a brine-pump which circulates the cold brine through pipes in the cooling room.

THE T-SQUARE CLUB'S EXHIBITION AWARDS.

FOLLOWING out the letter of instructions received from the President of the T-Square Club, the Jury of Award on the Joint Architectural Exhibition of the Pennsylvania Academy of the Fine Arts and T-Square Club, Philadelphia, Pa., met on the afternoon of December 28, 1906. All the members of the jury were present, namely: James P. Jamieson, Esq.; Carl Newman, Esq.; Thos. P. Anshutz, Esq.; Paul P. Cret, Esq.; Charles Grafly, Esq.; E. A. Crane, Esq.; C. C. Zantzinger, Esq. (chairman). The jury determined to make no distinction in the nature of the awards to be made to the exhibits of the several societies taking part in the exhibition. They, however, determined to subdivide the awards into several categories, to wit:

First, second and third mentions to be given to the exhibits of the several societies, on drawings, paintings or models.

A mention for photographs to be given for photographs of executed work.

A mention for school-work to be given on the school-work properly so called—that is, on all drawings exhibited by students or institutions or by traveling scholars.

On all work exhibited by the Allied Arts or others the jury have expressed their commendation.

Before proceeding to make these awards the jury placed "Hors Concours" the admirable drawings exhibited by the United States Library of Congress—namely, the plans for the improvement of Washington, and the drawings of M. G. Chedanne.

The awards follow:

FIRST MENTION (Blue and Gold).

Messrs.
E. H. Blashfield....Exhibit as a whole
E. J. A. Duquesne....Exhibit as a whole
Daniel Chester French....Exhibit as a whole
Cass Gilbert....Exhibit as a whole
Charles Grafly....Exhibit as a whole
A. Marcel....Exhibit as a whole
Carl Newman....Exhibit as a whole
Palmer & Hornbostle...Drawings for the Carnegie Technical School
Robert Reid....Exhibit as a whole
Carrère & Hastings...Perspective of the "New Theatre," New York

SECOND MENTION (Gold).

Messrs.
Jean Hebrard...."Palais de l'Automobile"
Cram, Goodhue & Ferguson....Exhibit as a whole
Carrère & Hastings...Drawings for the Palace de la Paix a la Haye
Wilson Eyre....Exhibit as a whole
Lord & Hewlett....Exhibit as a whole
A. B. Wenzell....Exhibit as a whole
W. B. Van Ingen....Exhibit as a whole

THIRD MENTION (Blue).

Messrs.
Maitland Armstrong.....Sketches for a window in St. Paul's Chapel
Delano & Aldrich....Drawings for the "New Theatre" Competition
John La Farge....Exhibit as a whole

MENTION FOR PHOTOGRAPHS.

Messrs.
Donn Barber....National Park Bank, New York
Cope & Stewardson....
McMillan Dormitories and Bryn Mawr College Library
Duhring, Okie & Ziegler....
Fireplace for Library, Chestnut Hill Academy
McKim, Mead & White....Library of J. P. Morgan, Esq.
George B. Page....Exhibit of Photographs
Rankin & Kellogg........Indianapolis Court House and Post Office
York & Sawyer....Rochester Trust and Safe Deposit Co's Building
Horace Trumbauer....Hartman Kuhn's Residence
Olmsted Bros....Exhibit of Photographs
C. C. Zantzinger.......Alterations to House of L. C. Madeira, Esq.
Miss Violet Oakley....Exhibit of Photographs

SCHOOL MENTION.

Messrs.
Frank Lea Bodine.."Tower in the Style of the French Renaissance"
C. Edgar Cope...."Subway Kiosk"
W. W. Hannon...."Automobile Club"
Frederic C. Hirong....Preliminary Study for "Paris Prize"
C. E. Howell....Exhibit as a whole
W. T. Karcher....Measured Drawings of a House at Chartres
W. H. Fenton...."Hunting Lodge"
M. H. Whitehouse...."State Automobile Club"
W. W. Sharoley...."Auditorium"

COMMENDATION.

Messrs.

Grueby Faience Company................................Tile Work
Henry C. Mercer...Tile Work
Walter F. Price....Remarkable Collection of Photographs of Travel

The jury takes pleasure in congratulating the management of the exhibition upon the excellence of the exhibition as a whole. The bringing together of the Allied Arts under such favorable conditions as are offered by the Academy was a new departure this year and seems to the jury to have been very fortunate and successful. The excellent hanging and grouping of the exhibits greatly facilitated the work of the jury.

The jury hopes that another year it will be possible to make the exhibit of the American Society of Landscape Architects larger.

With regard to the exhibits of architectural drawings, it should be said that the absence of the plan and section of the buildings for which the drawings were shown in many cases greatly lessened the interest of the exhibits, and the jury would suggest that another year exhibitors be encouraged to make the exhibit of their work more complete in this respect. In fact, it seemed to the jury that in the future only such drawings as include plans should be considered for the highest awards.

As a guidance for the juries of the future, the jury of this year would lay down the general proposition that they believe that awards should be made on the exhibits shown on the walls of the exhibition, irrespective of the executed work, and that consequently a complete set of plans, elevations and sections should militate in favor of the higher award.

The jury consider an exhibit of photographs of executed work, accompanied by plans of the same, as a very satisfactory form of exhibit, though it should not be susceptible to an award as high as that offered to drawings.

C. C. ZANTZINGER, *Chairman.*

February 18, 1907.

THATCHED ROOFS.

THATCHED roofs are now becoming very prominent among decorative geared features of Pennsylvania country-seats and surrounding well-kept farm homes, and it is a question whether the Pennsylvania German ancestors are responsible for instilling in the hearts of their descendants love for the quaint building methods of the Fatherland or whether it is a mere following of the popular fad for introducing Japanese gardens on extensive estates.

Certain it is that much of the roofing of summer-houses and other garden retreats is decidedly Dutch in design, being characteristic of the picturesque thatching that attracts the attention of the traveler in the vicinity of Rotterdam and throughout the country districts of Holland, while other quaint roofs of thatch are distinctly Japanese in design.

On the Mercer estate at Doylestown some of the finest types of thatching are found throughout the garden decorations, and especially in the pheasant yard, where the gayly plumed fowls have charming houses, walled with bark and roofed with thatch. The long, low shelters for the pheasants extending along the end of the yard are finished with a thick warm thatch extending to the ground, on the northern exposure, with the sunny southern exposure left open.

For the thatching various materials are employed. For the commonest work straw is used; better kinds of thatch are made of long meadow grass, and there is a tough kind of reed used for this purpose, and also a certain species of rush. The roof requires no special preparation to receive the thatch, save that the rafters and framework shall be close enough together to receive it.

The thatch is formed in suitable masses, combed with the fingers, and otherwise arranged so that the straws all point in the same direction. These masses are then secured and bound down to the roof by long poles, which are afterward removed. While the thatch is bound down in this way it is beaten into place by a wooden mallet. The thatch is then trimmed into shape by a pair of long-handled shears. This is only the barest outline of the process of thatching, and the methods differ slightly according as to whether the Dutch or the Japanese thatches are copied. When a roof is finished it presents a clean, trim and symmetrical appearance, which seems surprising, when the nature of the material is considered. The eaves are trimmed off square or slightly rounded, and are often very thick, being sometimes two feet or more in thickness. This does not indicate, however, that the thatch is of the same thickness throughout. The thatch seen in these various ways is thus seen in sections, and sometimes by way of contrast there will be successive layers of light and dark thatch.

While a good deal of skill and patience are required to thatch a roof evenly and properly, vastly more skill will be required to finish the ridge, which is often very intricate in its structure, especially when Japanese methods are followed. In some types taken from the Japanese plans vertical ridge-poles are seen with their ends freely projecting beyond the gable, and wrought in a gentle upward curve, and this style is effective in giving a light and buoyant appearance to what might otherwise appear heavy and commonplace.

A roof is sometimes seen which shows the end of a round ridge-pole projecting through the thatch at the gable peak, and at this point a flat spur of wood springs up from the ridge, to which is attached at right angles a structure made of plank and painted black, which projects two feet or more beyond the gable. This appears to be a survival of an exterior ridge-pole, popular in the early days of Japanese architecture.

Ridges composed of tile are also popular in the novel forms of thatch found on American country-seats. The construction of this kind of ridge is very simple and effective; semi-cylindrical tiles are used for the crest, and these in turn cap a row of similar tiles placed on either side of the ridge. The tiles are sometimes bedded in a layer of cement or mortar (in Japan a layer of clay or mud and chopped straw is used), which is first piled onto the thatched roof, and when laid in this the tiles are seldom displaced.

In the best types of thatching, special attention is given to the proper and symmetrical trimming of the thatch at the eaves and at the edges of the gable; and there are very clever ways in which this is managed. Sometimes at the peak of the gable a cone-like enlargement of a circular depression is curiously shaped out of the thatch and a good deal of skill is also shown in bringing the thick edges of the eaves, which are on different levels, together in graceful curves.

In some of the bark-walled summer-houses a novel bark finish is also found in the roof thatching. The ridge roof, which has a much sharper incline than the roof proper, is covered with bark, this being bound down by parallel strips; and spanning the ridge at intervals are straw saddles, sheathed with bark. These are very narrow at the ridge, but widen at their extremities.

A strikingly decorative feature of some of the thatched roofs of Japan should be more widely copied here: in many cases the ridge is flat, and this area is made to support a luxurious growth of iris, or the red lily. A most charming feature is often seen in the appearance of a brown, sombre-colored village in Japan, where all the ridges are aflame with the bright red blossoms of the lily, or where the purer colors of the blue and white iris form floral crests of exceeding beauty. This is a feature that might be introduced with strikingly picturesque effect for finishing the decorative thatched roofs of American gardens.

Another style of roof, sometimes of circular form, has the thatch on the slopes of the roof trimmed in such a way as to present the appearance of a series of thick layers, resting one upon another like shingles, in some instances from eighteen inches to two feet apart, with thick edges. Again the circular, evenly trimmed layers are very close and regular. A good example of this style of roof finish is found on the Harrison estate, at Glenwood Summit; and roofs of the close, thick, shingle-like thatching are also found in square form on some of the decorative garden houses of nearby country seats.

It is a matter of surprise to the uninitiated to discover how long these roofs will remain in good condition. Even with our unskilled thatching, merely for garden decoration, it is claimed that a roof may be depended upon to last from fifteen to twenty years with very little repairs; and it is said that in Japan the best kinds of thatched roofs will endure for fifty years. As they get weather-worn they are often patched and repaired until they have to be entirely renewed. In Japan and in many of the thatched roofs of France and Holland the oldest roofs are the most decorative, as they become filled with dust, assume a dark color and get matted down. Plants, weeds and mosses of various kinds then grow upon them, as well as masses of gray lichen, which cover the entire roof slope. And where the effect of antiquity is desired in the quaint forms of thatching now popular among Pennsylvania landscape gardeners this weather-worn, lichen-covered type might be readily imitated.

When properly constructed these thatched roofs shed water very promptly and do not get water soaked, and therefore prove serviceable as well as decorative.—*Philadelphia Record.*

"LAUGHABLE OR PITIABLE, WHICH?"

IT seems desirable to complete, by the publication of the following communication, the curious correspondence had over the proposed competition for a City-hall at Trenton, N. J., and published under the heading as above in our issue for February 11 last:

CITY BUILDING COMMISSION.

Trenton, N. J., February 15, 1907.

Messrs. Lacey & Adams,
Philadelphia, Pa.

Gentlemen:—

I am in receipt of your letter of the 11th. and note that you consider the program issued for the competition in question "unfair." Under the circumstances, the Commission considers it useless to continue correspondence with you on the subject.

Yours truly,
(Signed) F. W. ROEBLING,
President, City Building Comm

ILLUSTRATIONS

HOUSE OF MRS. R. H. TOWNSEND, 2121 MASSACHUSETTS AVE., WASHINGTON, D. C. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

MARQUISE OF THE SAME HOUSE.

HOUSE OF PORTER NORTON, ESQ., BUFFALO, N. Y. MR. GROSVENOR ATTERBURY, ARCHITECT, NEW YORK, N. Y.

STREET FRONT OF THE SAME.

PORTICO OF THE SAME.

MECHANICS' AND FARMERS' BANK BUILDING, STATE ST., ALBANY, N. Y. MR. RUSSELL STURGIS, ARCHITECT, NEW YORK, N. Y.

HOUSE OF DR. JAMES W. PUTNAM, DELAWARE AVENUE, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

DETAIL OF THE COLONY CLUB, MADISON AVENUE, NEW YORK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

We believe this plate will convince our readers that we were fully justified in saying, a while ago, that this building exhibited the "most immoral piece of brickwork to be found in the City of New York."

Additional Illustrations in the International Edition.

DETAIL OF STREET FRONT: HOUSE OF MRS. R. H. TOWNSEND, WASHINGTON, D. C. MESSRS. CARRÈRE & HASTINGS, ARRCHITECTS.

NOTES AND CLIPPINGS

THE HUGE RAILROAD STATION AT JUVISY.—There is now being built at Juvisy, in the outskirts of Paris, a station which it is believed will, when finished, be the largest in the world. At Juvisy there meet all the lines of the Paris-Lyons-Marseilles and of the Orleans systems, about thirty pairs of rails being interlaced. From this point there radiate the lines which carry traffic to southeastern France, to Italy, to Spain and Portugal. The new station covering all these rails is to be built on the latest principles, and its electric lights will illuminate the country at night for miles around. There is to be a large bridge, carrying the trains over a certain point at a height of twenty-one feet. —*London Globe.*

THE PREVAILING RATE OF WAGES.—The Appellate Division of the Supreme Court handed down a decision, February 8, affirming, without opinion, the judgment of the court below in the case of James J. Carey against the city. Carey obtained a judgment for $162.06 under the provisions of the law requiring the city to pay the "prevailing rate" of wages. He was employed as a painter in the Fire Department at $3 a day, and Justice Bishoff found the "prevailing rate" to be $3.50 a day.

SAN FRANCISCO INSURANCE.—On January 25th, Representative Kahn of California addressed the House of Representatives on fire-insurance companies and their relation to the city of San Francisco before and after the earthquake and fire, saying that at the time of the fire 118 companies had policies on property in the devastated district, all of which were American except thirty, and that of the foreign companies seventeen were English, six German, two Scottish and Canadian, respectively, and one each in Austria, Sweden and New Zealand. Most of the American companies had paid their losses in full, with the result of depletion of their capital and in several cases of insolvency. He paid a compliment to the English companies and most of the American companies, but said that the foreign companies, other than English, had endeavored to repudiate their obligations, and most of them have withdrawn from the State. In the cases of the German and Austrian companies, however, through the action of the German courts and the good offices of the State Department, he said, the insured will probably receive a settlement of fifty cents or more on the dollar. "Not one of the six German companies doing business in San Francisco prior to the fire of April 18, 1906, has paid its policies at a hundred cents on the dollar," said Mr. Kahn. "This is in marked contrast with the seventeen English companies writing business in that city, for most of the latter paid their obligations in full. Three of the German companies had immediately after the fire denied all liability and withdrawn from the State. Up to the present time these companies have not paid a dollar on their policies in that city."

A TRUE BLUE MARBLE.—When the deposit of white marble was unearthed at Talladega, Ala., U. S. A., it was said to be equal to the far-famed quarries of Carrara and Paros for statuary, quarry-owners at other places and the expert marble men in other States and cities pronounced the quarry a fiction. But an additional and different quarry has been opened near the original bed, containing fine-grained marble of good texture and of solid cobalt blue in color. The new marble is said to combine the texture of both Carrara and Parian marbles. The quarry is three miles south of Talladega.—*Stone Trades Journal.*

REAL ESTATE VALUES IN FIFTH AVENUE.—The Knickerbocker Trust Company and other buildings in the immediate vicinity of the intersection of Fifth avenue and West Thirty-fourth Street, afford an interesting study in values uptown. The assessed valuation of the Knickerbocker Trust Building is only $300,000, while that of land on which it stands, measuring 61 feet and 9 inches in Fifth Avenue, and 100 feet in West Thirty-fourth Street, is $1,100,000. At the Corporation Counsel's office the statement was made the other day that the Trust Company's officials testified at the recent proceedings for sidewalk obstruction that to tear down and replace the front of the building would cost $250,000. The building is four and a half stories high. The 16-story Waldorf-Astoria across the street has an assessed valuation of $4,550,000, and the land on which it stands, 187 feet and 6 inches by 350 feet, has an assessed valuation of $7,600,000. Æolian Hall is a 12-story structure, standing just beyond the Knickerbocker Trust Building, on a plot 50 by 100 feet. The assessed valuation of this building is $175,000, and of the land it occupies $725,000.—*New York Tribune.*

CORNELL SYRIAN EXPLORATION EXPEDITION.—Four Cornell explorers will start on March 9 for a trip through Asia Minor and Syria. The expedition will be headed by Prof. J. R. S. Sterrett, and with him will be Dr. A. T. Olmstead, '02; B. B. Charles, '06; J. E. Wrench, '06, and Dr. C. O. Harris, '98. All are members of the American School of Archæology at Jerusalem, and have had experience in field-work in Palestine.

They will get permits from the Turkish Government, and will leave Ancyra about May 1. They will travel through Asia Minor, going through Armenia, Syria and Palestine into Persia and Turkey. They will make extended surveys, identify ancient cities, and translate inscriptions.

The money for the expedition has been subscribed by W. K. Vanderbilt, Andrew Carnegie, H. C. Frick, J. P. Morgan, James Stillman, Mortimer L. Schiff and others.—*Exchange.*

THE TOTAL LOSS AT SAN FRANCISCO.—The committee of the thirty-five insurance companies, which acted in unison in settling their San Francisco losses by fire and earthquake, made public last month the list of their net losses by the disaster. The estimated sound value of the destroyed or damaged property insured by the 233 companies in San Francisco was $315,000,000, on which there was a net insurance loss of $180,000,000, covered by 102,000 policies. The gross loss of all kinds by the disaster is estimated by the committee at $1,000,000,000. The thirty-five companies in their settlements handled 42,077 claims. The largest settlements on individual building were: St. Francis Hotel, $992,200; Fairmount Hotel, $200,000; Merchants' Exchange, $582,000; Shreve Building, $384,497; Spreckles (Call) Building, $515,000; Chronicle Building, $80,000; Palace Hotel, $1,265,000.

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WHAT is transpiring in Massachusetts just now should cause some trepidation to Pennsylvanians, who of late have held the centre of the architectural stage, for they can hardly relish the idea that in a very few years they will be called on to enlarge their thirteen-million-dollar State-house. It is only some ten years that there has been in occupancy the great extension of the Massachusetts State-house, built to put an end to the complainings of the economically-minded that the State was wasting money in paying rentals to private owners for the quarters of sundry public departments that could not find house-room in the old building, and yet the same complainings have broken out again. The State is once more paying heavy rentals for officials who cannot find room even in the enlarged building, and Massachusetts must now build a new office-building for their accommodation on the northerly slope of Beacon Hill, in the rear of the State-house, and connected with it by a bridge over Derne Street and a subway below it. The explanation of this unfortunate necesesity is not so much that the public business has grown rapidly, or that new departments have been created—though several actually have been—as that the present extension, admirably and economically built as it was, was planned in a somewhat wasteful way. Enough space was consumed in the over-broad corridors and in the more than generously large offices to provide for the departments that must now have a special building erected for them. Very likely the architect was not blameworthy for this waste, which probably came about in this way: The heads of departments, having long suffered because of cramped quarters, but not realizing how the difference between long and square measure affects cubic contents, decided that their new quarters must be so many feet longer and so many feet wider than their old ones, and sent in their requisitions for space on a basis of long measure, and the architect simply satisfied their requirements. The result is that in the Extension will be found rooms where only two or three men work, which would be made in private business to accommodate conveniently four or five times as many. Now, as this extension in Boston was not primarily built for display, but for use, and as the building at Harrisburg distinctly was built for display, it is more than likely that it embodies the same mistakes in the matter of the area of the rooms contained in it in an even greater degree, and Pennsylvanians should not be surprised to learn, in a few years, that the State is paying office-rent again to private owners.

HAVING secured their costly Capitol, the Pennsylvania politicians now declare that there should be built in Harrisburg a new "Executive Mansion" for the Governor, and this, too, although the present one was built only about a score of years ago, and still displays among its mural decorations the portraits of the politicians of that day, portraits which gave brazen countenance to those later portraits in bronze which now stare from the bronze doors of the Capitol. Doubtless ex-Governor Stone, President of the Capitol Building Commission, will be given a chance to express himself about those doors at the public hearings before the Investigation Committee of the Legislature, which, in spite of the whitewashing report of which Attorney-General Carson delivered himself on his retirement from office, began this week. Perhaps something can be accomplished in the way of recovering from those who seem to have plundered the State so successfully, though it can be only a partial righting of wrongs, and not a satisfactory prevention, such as seems likely to be accomplished elsewhere in their State, if the Nesbit bill for the appointment of a State Architect prevails; for this bill, which places the designing of hospitals and asylums in the hands of the new official, is expected to interfere seriously with the schemes of the Philadelphia politicians, who had maneuvered a large amount of hospital work into the hands of the brother-in-law of the "machine boss."

ALTHOUGH it seems probable that the Constitution of the new State of Oklahoma is to contain the provision that it shall be "the duty of the Legislature to make laws governing the practice of architecture in the State," a provision which, we presume, foresees the enaction of an architects'-license law—which in such event must be accepted as constitutional—we are rather gratified to note that in Minnesota the petitioners for the enaction of a similar license-law have been given leave to withdraw. In this connection, it is to be noted that there are now in Illinois just over seven hundred licensed archi-

tects, twenty-two having secured licenses during the last year, and we should think it might occur to the citizens of that State that they had consented to the legalized establishment within its boundaries of a very tight little trade union, profitable enough to the public treasury in the way of fees, perhaps, as the accounts for the last year closed with a credit-balance of nearly fourteen thousand dollars, but of whose advantage to the public none but negative evidence can be adduced. We wonder whether the Examining Board has yet prepared a tabulation that contrasts the shuddering condition of the citizens of Illinois while subjected to the experimentation of unlicensed architects with their present serene state of safety and comfort, now that those same architects have to pay the State ten dollars per year.

THERE is a distinct ignominy in obliging architects to pay an annual license-fee, as if they were suspicious persons, ticket-of-leave men, who must be rounded-up at least once a year, and it is an ignominy to which no other liberally educated man is subjected. For our own part, we hold it to be unfair to subject the practitioners of an art to measurement by a standard that can fairly be applied to a science only. But, for the sake of argument, we will admit for the moment that examination, if not necessary, has at least a semblance of countenance in the examination method that, to a degree, prevails in other professions. But, in the first place, the examination in the other professions is had and done for as a single operation; there is no succession of annual fees. As members of the bar are themselves by that fact officers of the law, it is proper enough that the law should determine the methods by which they may become such officers, and as doctors and pharmacists are concerned daily with matters of life and death, and nothing else, it is proper that they should prove by examination that it is safe for the public to allow them to practise their callings. To assume that the practice of architecture is a deadly calling is, in the great majority of cases, an exaggerated assumption; but, if adopted, it should, in equity, be companioned with a requirement that should compel the occupier of every building to take out an annual license for its use, conditioned on his pledge not to subject the building to improper use or strain during that year. If the State is out after income, here is a way that will produce more than the architect's license brings it, and one which will give the public really more protection.

IF for real or fanciful reasons there is a general demand that architects should be hall-marked, so that the innocent public may know whom they are dealing with, there is but one decent and non-dishonoring way to follow. The profession must affix its own stamp. A United States law compelling the American Institute of Architects to recruit its membership solely by examination, and requiring its members to append to their signatures and to their names on signs, letter-heads, etc., the initials A. I. A., and at the same time authorizing them, and them only, to collect fees for their services according to the existing schedule of charges, would accomplish all the good that is covered by the license-laws, and would have in it nothing offensive to self-respect. It would leave the partially capable and the "shyster" still in position to earn a living in innocent ways, if they could find any one to trust them, but would render them practically harmless, for the quack and the shyster are really dangerous only when they are unknown as such and can masquerade as reputable practitioners.

ARTISTS of all kinds and of all nationalities, everywhere, will be glad to learn that Mr. C. H. Niehaus has determined to bring suit in a claim for damages in the amount of $125,000 against the President and Board of Directors of the late Louisiana Purchase Exposition Company, because, as our readers know, they cast in bronze, against the sculptor's protest, the colossal equestrian statue of "St. Louis" that was one of the notable artistic features of that affair. The correspondence that passed between the officials mentioned and the National Sculpture Society may be found in another column. Mr. Niehaus would, perhaps, have a better chance of recovering something, if the officials of the Exposition had not just been forced to pay, after long dispute, the prize of $25,000 they offered to give the person who guessed with nearest accuracy the number of paid admissions to the grounds!

SEVERAL years ago, we were asked by the publisher of a French architectural journal to write for it a series of papers dealing with successful American country-houses. Although we could not accede to the request, we gave the matter sufficient consideration to reach the conclusion that the distinctive characteristics of an American, as distinguished from a Continental, dwelling-house were determined through the necessity of giving a vastly greater consideration to providing pleasant and convenient working and living accommodations for domestic servants than is customary in other countries, and that the really "successful" houses were those where the servants' interests were paramount over those of their employers. Architects who are called on to design Newport, Lenox, or Tuxedo "cottages" have learned how large a factor in their problem the "servant question" is, just as have our wives and mothers everywhere. But it is not only in the houses of the wealthy that the architect should give considerate aid to the troubled *hausfrau*. He should realize that the domestic servant has not in the past, and is not even now, been properly provided for in the solutions of the problems he habitually places before his client. Most architects provide their houses with fairly convenient, pleasant and well-equipped quarters for domestics down-stairs—kitchen, pantry and toilet-room, with frequently an outside porch or piazza. But there are few houses where the servants' bedrooms are what they ought to be, and there are fewer still that provide a bath-room and a sitting-room, and yet in most houses there is enough space on the attic floor wasted or left unfinished as a "lumber-room" to provide a convenient and pleasant sitting-room where female servants in their off-time can escape the heat and odors of the kitchen ; of course, where male and female servants are employed, it would be more *comme il faut* to have a "servants'-hall" on the lower floor.

ITALIAN DOORWAYS.—I.

THE architect, the artist decorator, in all times, fixed his attention especially upon the doorway, and often the doorway in a façade can be likened to a jewel in a jewel-case: it sparkles in its sculptured beauty as it stands out against the nudity of the wall and catches the attention. The richness of the doorway is more remarkable in the Mediæval style, than in those preceding or succeeding them; but decorative sculpture reached its acme during the Gothic period in France, Germany and even in England rather than in Italy: in those northern countries the Gothic style attained its highest successes. In fact it was these northern climes that saw the origin and development of those marvelous porches, exterior vestibules, that Italy, indeed, knew in its Lombard and Romanesque work but in its Gothic work neglected in favor of those doorways which never, on the peninsula, resembled those which open so generously in the façades of the great Gothic churches of Paris, Amiens, Chartres, Bourges and Rheims.

We shall perceive this, and immediately, for this essay is not to begin with considering the remoter styles of Italy. I am not going to explore the artistic action of Etruria or Magna Græcia. I do not mean even to halt over the architectural wealth of pagan Rome. Moreover, everyone knows the doorways common amongst the elder peoples of Italy, doors having an opening in the form of a trapezium and jambs inclined inwards, forms in favor with the Etruscans and Italiotes of the peninsula. The Romans, however, did not always adopt the fashions of their masters, the Etruscans and the Greeks, not even where Græcism had a certain vogue and strength; for, in the celebrated Temple of Vesta, at Tivoli, the doorway, although having inclined jambs, has a crowning finish that was not common with the Greeks or Etruscans. Further, the inclined jamb is not found in the doorway of the Pantheon at Rome, the most perfect specimen known of this feature of Classic buildings: the opening is perfectly rectangular.

Vitruvius in his classification of the forms and ordonnance of doorways mentions only those that are rectangular and specifies three kinds, the Doric, the Ionic and the Atticurge or Corinthian, a class to which the doorway of the Pantheon does not belong, since the Atticurge doorway would have inclined jambs; so, for this particular type one must turn to the Temple of Vesta, at Tivoli. Serlio mentions a Corinthian doorway as existing in his time at Palestrina (the ancient Præneste) and those who are interested in this subject can turn to his "*Libri d'Architettura,*" where they will find this feature of Roman architecture illustrated.

DOOR-HEAD: S. ANDREA, PISTOJA.
Gruamonte and Adeodato, Architects.

But rich as they were, whether Corinthian or not, the doorways of the ancients did not achieve the sumptuosity of those belonging to the more modern styles we are about to explore, the Byzantine, the Lombard, the Romanesque and the Gothic, in the first place.

I said, just above, that the peninsula did not possess any porches that were comparable to those of France; yet, in fact, among the doorways most richly decorated with archivolts and collonnettes, the elements chiefly used in the decoration of this feature of our buildings, are those of S. Mark's at Venice. The central doorway, shown elsewhere, does not differ materially from the others in the superb façade of the building. Would you, then, care to have them compared with French doorways? Yes? Well, the doors of S. Mark's (last half of the eleventh century) are more ancient than those that open in the façades of Notre Dame de Paris, and the cathedrals at Chartres, Amiens, Bourges and Rheims. But of the types that by reason of their date might here be brought to the reader's attention, the Gothic types of the peninsular, not one could sustain a comparison with the corresponding type in France. I am not sure, though, that it is proper to include in this statement our Lombard and Romanesque examples. But, at any rate, it is true that among the porches that are to be found in Italy—at Milan, Pavia, Borgo S. Donnino and in other cities in the north—not one can be found that even suggests the magnificence of the side porch at Bourges. What we especially lack in Italian work are the tympana that in French work are so lavishly decorated with bas-reliefs, containing often hundreds of figures, arranged in superposed friezes, which give an indescribable richness to the composition, while in Italy sculptural treatment is essentially confined to the jambs and archivolts.

From among the more important examples I select the main doorway of San Ambrogio, at Milan, and those of San Michel and San Pietro in Ciel d'Oro, at Pavia. These are features of very remarkable monuments in the Lombard style, erected at its very birthplace and by the Magistri Comacini, the missionaries of the Lombard style, as were the Cistercian monks of the succeeding style, the Gothic. We have before us doorways that do not date farther back than the eleventh or twelfth century, in spite of the belief of those who would like to carry the date back to the seventh or eighth. The doorway of San Ambrogio at Milan is worthy of remark by reason of the beauty of its proportions and the elegance of its details, at once rich and well balanced. Fortunately we know the name of its author, a certain Adam Magister, who signed his name and title high up on the second colonnette at the left.

It is not necessary for me to point out to the reader that the interlacements, the straight lines and the curves which cross one another on the doorway of San Ambrogio and of the type that is common to the Lombard style, are asymmetric, as my friend Professor Goodyear would call them, as much in their fundamental lines as in their ornamentations. And you will note that my example is, in the matter of depth of jamb and number of colonnettes and archivolts, quite sober, and this character is common to Lombard work. Study the examples from Pavia: in the doorway of San Pietro is shown a composition enframed by two engaged colonnettes supporting a shorter pair and bound together by two sculptured bands, while the pediment, decorated by three carved figures, which constitute a sort of triptych, enriches the upper part of the doorway, the conception of which leads us directly to those steep pediments or gables so much used in Gothic work, enriched there with crockets and crowned with a fleuron. This example at Pavia is to be especially remembered and recalled.

A still more curious type for you to know is that which individualizes the monuments of Pistoja, Lucca and Pisa. In these Tuscan cities the Lombard or Romanesque style blossoms out in a peculiarly local but artistic fashion. These doorways offer modifications of the style which I cannot enumerate one by one. Here there are neither colonnettes nor archivolts. Two plain uprights, with moulded bases and crowned with storied capitals bear a sculptured lintel bordered on the upper edge with a foliated moulding. Above this springs an arch, the solemn crowning feature of the whole doorway composition. This brief description, although based especially on the doorway of S. Andria at Pistoja, fits equally well the doorways of S. Giovanni Fuorcivitas, S. Bartolommeo or S. Pietro, in the same town. I name S. Andria because its doorway is ornamented with a bas-relief of

an exceptional historical value. We have here a model of Italian sculpture of the twelfth century done by Gruamonte, who flourished about 1166, and who signed himself on this frieze *"Magister bonus"*; he had as a partner his brother Adeodato. The poverty of these figures, taken in connection with the qualification *"bonus"* of the sculptor, makes plain to us the feebleness of Italian sculpture at the end of the twelfth century. Nevertheless, this doorway, with Gruamonte's frieze, is profoundly decorative, and if pedantry can scoff at the lintel with its superposed arch, the composition of the sculpture and the intentional repose which the architect (perhaps Gruamonte himself) has given to the entire feature rejoice the beholder.

In the same way the eye is pleased when it falls on the doorway in the facade of S. Giusto, at Lucca. The date is nearly the same and the general treatment does not vary greatly from that at Pistoja. Perhaps the example at Lucca excels its elder at Pistoja in the beauty of its frieze, which, so far as style goes, is superb. The cunning chisel of the unknown sculptor makes the doorway of the little church of S. Giusto a veritable jewel.

Richness or lavishness increases with the development of the Gothic style, and in the principal doorway of the Cathedral at Genoa we have a noble specimen of sumptuous treatment. Here we have a wealth of colonnettes and archivolts, and, as well, a sculptured tympanum after the French manner. This doorway seems to give the lie to what I wrote above of the tendencies of French and Italian Gothic. But we must remember the influence of French fashions of this cathedral at Genoa, which was building during several centuries—twelfth, thirteenth and fourteenth—and this influence will open the eyes of the critic, who should not be forgetful of the connection that existed at this time between France and Italy. The Peninsula owes to the Cistercians the first blossoming of the Gothic style, which is not only recalled by this example at Genoa, but, setting aside the abbeys at Fossanova, Casamari, and Valvisciola, all conceived in the French manner, is found expressed in many other of our monuments. The Cathedral of Siena, in its older portions, those dating from the thirteenth century, is one more proof of this. The Cathedral of Siena is the daughter of the Abbey of S. Galgano, a Cistercian monastery, near Siena, so one cannot be surprised at finding here certain reminders of French style. If you turn to the illustrations, you will find the tympanum peopled with sculptures. I am far from saying, however, that the same sort of treatment is not to be found elsewhere in Italy. On the contrary, the doorways of the Baptistery at Pavia, by Benedetto Antelami—end of the twelfth century—have their tympana enriched with sculptured images done by an artist famous in his day. But France carried the fashion much farther than Italy ever cared to do. Besides the difference between the luxuriance of the doorways of the cathedrals at Genoa, at Siena—even of the Baptistery in that grand city of Tuscany, creation of Giacomo de Mino del Pellicciaio—the difference, I say, between the doorways of the cathedrals at Florence and Orvieto, of S. Francesco at Assissi (I am naming the finest of the Gothic monuments our Italian religious architecture can boast) is startling, especially when we consider the mighty population of statues housed in their niches, one above another, in the jambs of French cathedral doorways. This sort of thing is never found in Italian Gothic, which, at most, finds richness in the repetition of colonnettes, some smooth, some carved in spiral, in marble of two or more different colors, as is shown in the view of the doorway of the Cathedral of Genoa. The lack of sculpture, or, rather, of statues, is, from a Frenchman's standpoint, one of the chief defects of Italian Gothic doorways. You will find the real Italian spirit rather in such doorways as that of the Baptistery at Pistoja than in many of the doorways that have richer jambs and decorations and more numerous archivolts.

DOORWAY: S. GIUSTO, LUCCA.

CENTRAL DOORWAY: SS. GIOVANNI E PAOLO, VENICE.

The genius of Italian architecture inclines towards sobriety, and sobriety is the keynote of the nobility of this Baptistery doorway, magnificent with its capitals and its bits of supple and vigorous sculpture, which do so much honor to Cellino di Nese, who flourished about 1337. The little rose-window in the pediment should be noted, for it is a treatment not at all common. I remember noting this feature introduced in a design submitted in a competition for the façade of S. Francesco, at Siena, I being on the jury at the time.

The true Italian spirit is shown, too, in the majestic doorway of SS. Giovanni e Paolo, at Venice, which dates from the fourteenth century and belongs to the transition period between Gothic and Classic forms—that is, to the birthday of the Renaissance, of which Venice, amongst its monumental treasures, possesses so many glorious examples. The transition, which approaches hybridism in the Corinthian capitals and the pointed arch, is very pronounced in this Venetian doorway—the church was finished, so far as concerns essentials, in 1390—far more

than in the famous "Porta della Carta," worthy entrance to the finest public palace the world can show, as Ruskin would say. This doorway was created by Giovanni and Bartolommeo Bon, father and son, architects and sculptors (*"lapicidi" on "tajapiera,"* as they modestly styled themselves in those days). These two artists began the "Porta della Carta" in 1438, after having labored for several years upon other parts of the Ducal Palace, and finished it in 1442! Signed by Bartolommeo alone, whose name ("Opus Bartolomei") is carved on the lintel, the records show that Giovanni assisted him in this work, whose vivacity of composition is so marvellously married to the grandeur of the style.

No one, then, can be surprised that such a model of beauty should have had imitators—for instance, the doorway of the now desecrated Church of S. Francesco, at Ancona, conceived and executed by Giorgio da Sebenico, called "Dalmatico," or, better still, Giorgio Orsini de Mathieu, born at Zara, who was living in Venice at the time when the Porta della Carta was building. The doorway at Ancona, which has the fortune to be erected at a very favorable spot on a lofty site, was begun in 1454. It cannot, however, be fairly compared with its model at Venice.

The same artist executed, in Ancona also, another interesting doorway, one for S. Agostino, which, though artistic, is far less happy than the one he did for S. Francesco; it was begun later than 1460.

ALFREDO MILANI.

(*To be continued.*)

EXCESS OF ESTIMATED OR STIPULATED COST OF BUILDING.

CASES for the recovery of an architect's fee sometimes turn upon the question whether the estimated or the stipulated cost of the building has been exceeded, or materially exceeded, by the plans and specifications submitted, where the plans and specifications have been rejected on that ground. This question has been repeatedly before the courts of last resort, and it may not be amiss to examine the cases which have been decided upon the point. While the principles upon which the decisions proceed are well settled, each case must be decided according to its own circumstances as to the amount of excess which will be allowed, if any, without vitiating the contract. A glance at what has actually been decided under the various circumstances may indicate the dangers to be avoided and serve as a guide in making contracts.

There are several points to be considered. First, the contract may make the absolute condition that the cost shall not exceed a certain sum. On the other hand, no stipulation may be made, but an estimated cost may be agreed upon or stated by the architect. Second, the question may arise whether plans and specifications submitted may not be capable, with a little alteration, of being pared down so as to bring them within the required cost, enabling the architect to recover his fee for the plans as submitted. Lastly, it may be a question, where bids are asked for and received, and the building has not been proceeded with, how far these bids are conclusive as to the real cost of the proposed building.

Where there is an absolute condition that the plans will only be accepted, provided they can be carried out for a stated sum, it is clear that they must not entail a cost materially in excess of that sum; but it is probable that a slight excess would not vitiate the contract, if, with little trouble, the plans could be altered so as to bring them within the required limit.

Not all of the decisions show to what extent the sum stipulated has been exceeded, but something may be gathered from the language used by the courts in pronouncing their opinions. In Ada Street M. E. Church *vs.* Garnsey, 66 *"Illinois"* 132 (1872), plans for a church building were drawn by different architects and submitted, in competition, to the building-committee of the church. Those of the plaintiff were approved, provided they could be carried out for a certain specified sum of money, the exact amount of which is not stated in the opinion of the court. When the fact was ascertained that they could not be carried out for this sum, all the plans submitted were rejected by the building-committee. The court held that the liability of the church depended upon the existence of a contract to accept in any event, whereas the proof was conclusive that the acceptance was conditional, depending upon the fact that the building after the plaintiff's plans could be built for a certain sum. The plaintiff was therefore not entitled to recover.

It is quite clear that a material excess over the stipulated sum will vitiate the contract. Where one item of an architect's account sued on was for plans, etc., for a building to cost not more than $4,500, and the plans made and charged for were for one estimated by the plaintiff to cost $8,000, the court held that this estimate was so grossly in excess of the cost of such a house as the defendant instructed the architect to prepare plans for that it showed he disregarded her wishes. The plans were not accepted or used, and the court held that no recovery could be had. Emerson *vs.* Kneezell, Texas Civ. App. 66 *"Southwestern Reporter"* 551 (1900).

In Horgan & Slattery *vs.* New York City, 100 *"New York Supplement"* 68 (1906), the contract was for plans and specifications of a building, the cost of which, including architects' fees, should "be kept well within the sum of $450,000." On the plans and specifications submitted, bids were asked for and none was received within the $450,000, all being in excess thereof and ranging from $666,394, the lowest, to $744,394, the highest, exclusive of architects' fees. The bids were all rejected as being in excess of the Board's appropriation and subsequently the plans were rejected for the same reason. The excess cost was held to be so great that it could not be said the plaintiff had substantially performed his contract and it was held he could not recover thereon. The architects did, however, recover on a *quantum meruit* for the benefit which had been received by the defendant from the use of their plans.

In Kinney *vs.* Manitowoc County, Wis., 135 *"Federal Reporter"* 491, the Committee of a County Board were held not authorized to contract for plans for a building to cost $100,000, exclusive of the necessary plumbing and heating, where the resolution of the Board pointed to a building of a total cost not exceeding $100,000.

Where plans were open to competition, one of the stipulations being that the cost of the building was to be limited to $400,000, evidence tended to show that the directors and their experts were of opinion that the building could not be constructed of suitable material and workmanship, under the plaintiff's plans, for that amount, and that plaintiff knew he would not receive the award of greatest merit unless he gave a guaranty to that effect, and that the parties commenced negotiating concerning a new contract. It was held that the award had never been made and that the plaintiff had waived and abandoned the contract. Walsh *vs.* St. Louis Exposition & Music Association, 101 *"Missouri"* 534 (1890).

The circumstances under which litigation is most likely to arise are: where there is no express stipulation as to cost, but where an estimated cost is submitted or agreed upon, or where the cost is required to be "about" a certain sum, or where the agreement is oral and there is conflicting evidence concerning the cost of the building. Under such circumstances the rule followed is that a slight excess of the estimated cost will not deprive the architect of his compensation, but a material excess will.

Let us first take the cases where the "estimated cost" is exceeded. In Feltham *vs.* Sharp, 99 *"Georgia"* 260 (1895), the account sued for was for preparing plans, etc., for the erection of a building in Waycross, Ga., at an estimated cost of $4,300, at 3½ per cent. of such estimated cost. The plaintiff testified that he advised the defendant to advertise in the Savannah and Jacksonville papers for bids under the plans and specifications prepared by the plaintiff, and that he did not do this, but simply submitted them to two local firms of builders. The defendant's evidence was to the same effect. In addition, the defendant testified that the bids of one of the firms was $7,800 and that of the other about $9,000. The court held that there could be no recovery, if the jury found that the cost of the erection of the building in accordance with the plans and specifications would largely exceed that—would cost the sum of $7,000 or $9,000. The jury found for the defendant and the verdict and judgment were affirmed.

In Buckler *vs.* Kneezell, Texas Court of Civ. App. 91 *"Southwestern Reporter"* 367, the estimated cost of the plans, etc., was $40,000 and the plans submitted were for a building to cost $50,000, but the court held that the architect was entitled to recover his fees, as there was neither allegation nor proof by the defendant that the cost of the building was to be limited to any sum, or the payment of the architect conditioned on the building not exceeding a cost of $40,000. In this case the court seems to have gone farther than any of the other cases decided upon this point in regard to the latitude allowed to the architect where estimated cost is stated.

In Maack *vs.* Schneider, 57 Mo. App. 431 (1894), the plain-

tiff's evidence tended to show that he was not limited as to cost of erection. The defendant's evidence tended to show that the plaintiff was limited to a cost not exceeding $18,000 for the erection of seven houses. The plaintiff prepared the plans and delivered them to the defendant with an estimate showing the cost of their erection to exceed $33,000. The defendant submitted the plans to some builders, who estimated the costs of their erection at $40,000 or more. It appearing that the cost would greatly exceed the amount which the defendant desired to expend, the project of building the houses was abandoned. Under these circumstances the court held that the defendant was not liable for the contract price of the plans.

In a Texas case, Smith *vs.* Dickey, 74 *"Texas,"* 61 (1889), where sketches and estimates were made at the owner's request for a hotel building, to cost "about $100,000," the agreement was held to be complied with, where, according to the estimates furnished, it would have cost, including the architect's fees for the estimates and plans and for superintendence until completion, $107,598.75. There was no agreement for superintendence of the building. The estimates amounted to $102,475, and the architect testified that, if he had superintended, his fees would have been five per cent. on that amount. The court did not regard the architect's fees as a part of the estimate, but, even if they were so regarded, they thought the gross sum was "about $100,000," and a compliance with the contract, and gave plaintiff judgment for the amount of his claim.

The case of Coombs *vs.* Beede, 89 *"Maine"* 187 (1896), is an instructive one. Here the architect was employed orally to prepare plans and specifications for a building on the defendant's lot. The evidence showed that the defendant told the plaintiff that he did not want the cost to exceed $2,500. It also showed that the defendant's wife not only wanted the expenditure not to exceed $2,500, but at the same time she wanted a house worth much more than that, and that the architect was trying to arrive at the desired result as best he could. Alterations were made on the plans and several conversations had between the parties regarding them. On the plans finally submitted, bids were advertised for and four obtained, ranging from $3,300 to $4,400. The plaintiff at last got a bid for $3,100, which the plaintiff refused to accept, and at the same time he refused to consent to have the plans cut down so as to obtain a bid within the desired price. Depending on their recollection of the plaintiff's plans, the defendant and his wife appear to have acted as architects themselves and constructed a house and stable on their lot at a cost of over $3,500. The wife testified that the house "was brought to the same degree of completion that a house would have been by his (plaintiff's) specifications for a little less than $2,700." The court held that even if the plaintiff had undertaken to make plans for a house to not exceed $2,500, and no more, and, if acting in good faith, he exercised his skill and ability in an endeavor to bring about that result, that was all that could be expected or required of him. And if the house designed by him could be built for less than $2,700 it could hardly be called a failure, especially in view of the interferences on the part of the plaintiff's wife; nor a failure if the plaintiff could so have altered his plans as to reduce the house in price.

Fairfield *vs.* Hart, Mich. Supreme Court, 102 *"Northwestern Reporter"* 641, was an action for $120 for architect's fees for the preparation of ten plans. The testimony showed employment; that no price was agreed upon; that the construction was to be cheap; that the work was performed, and that $12 each for the plans was a reasonable price. There was considerable proof taken, which is not reported, upon the proposition that the plans were not of value, because the cottages indicated by them could not be built within the limit of cost fixed by the defendant. But plaintiff did not testify or admit that any precise cost or range of cost was stated by the defendant. It was for the court to find that fact and there was testimony which would have supported a finding for either contestant. The Supreme Court, therefore, refused to weigh the evidence, and decree and judgment for the plaintiff were affirmed.

In Marquis *vs.* Laureston, 76 *"Iowa"* 23 (1888), an action for the cost of plans and specifications of a building, which the defendant ultimately decided not to build, on a written contract for an agreed compensation of three per cent. on the cost of the building, the architect claimed $400, of which $50 had been paid. The architect testified that the cost of a building erected from the plans would be nearly $16,000. The District Court found that the estimated cost of the building contemplated was $10,000, and gave judgment for $250. On appeal, the defendant argued that a $10,000 building could not be erected in accordance with the drawings made. The evidence showed, however, that after the plans and specifications were prepared the defendant refused to accept them and thereupon the plaintiff suggested the taking off of the fine stonework and making the plans apply to a building which would not cost over $10,000. The defendant then accepted the drawings and advertised for bids. The court held that this evidence explained the testimony of the architect and showed that the two findings of the court did not conflict.

THE CORRESPONDENCE OVER NIEHAUS'S STATUE OF "ST. LOUIS."

THE National Sculpture Society, after an investigation of the action of the Board of Directors of the World's Fair at St. Louis, in making permanent the model of the statue of "St. Louis," by Charles H. Niehaus, the New York sculptor, without Mr. Niehaus's consent, condemned the action of the directors, and this moral support given by his fellow professionals has doubtless had its effect on the sculptor's decision to bring suit against the directors in the sum of $125,000.

In the final letter of the Society to David R. Francis, President of the Louisiana Purchase Exposition Company, it is charged that the directors have used a sculptor's work in a way not permitted by any fair construction of their contract with him, and that they have so used his general design as to misrepresent his taste and workmanship, and thus attack his professional repute.

The Society, on September 20, 1906, through its secretary, J. Scott Hartley, sent a letter to the Louisiana Purchase Exposition Company and to Mr. Niehaus, asking them, respectively, to submit the facts in the case to the Advisory Committee of Sculpture for the Louisiana Purchase Exposition—J. Q. A. Ward, Augustus St. Gaudens and Daniel C. French—for its opinion on the question involved in the reproduction as permanent sculpture in bronze of the "staff" model of the equestrian statue of "St. Louis," temporarily constructed for the Exposition. The letter, in part, follows:

"Notwithstanding the evident merit of the statue in question, its huge size had much to do with its selection for permanent reproduction, as the Exposition Company utterly ignored the advice given, to reduce the statue to the limits within their means, Messrs. Taylor, Bitter and Niehaus commending such a course to be taken.

"The statue was enlarged from a half-size model, the enlarging being done under the direction of the chief of sculpture in a remarkably short time by such assistants as were available, the result being excellent for its temporary purpose, but justly declared unfit for bronze casting by the designer, the truth of which every sculptor will readily understand without further explanation. Furthermore, the open-air exposure for two years and several coats of paint were bound to destroy even temporary surface finish.

"Owing to the prominence of the work involved, the precedent established in this case is a danger to the entire profession, and we would suggest that the following action be taken:

"That the National Sculpture Society officially ask the Exposition Company, and also the sculptor, Charles Niehaus, to lay the facts of their case before the advisory board with acted upon matters of St. Louis sculpture, and accept the advice given by that board.

"That all further action be deferred until the result of this request be submitted to the council."

Mr. Niehaus complied with this request, but the Exposition Company declined to submit the matter to the Advisory Council, claiming that their contract did not contemplate or provide for such reference.

The letter from President Francis to that effect was in part as follows:

"The Louisiana Purchase Exposition Company contracted with Mr. Niehaus for a model for a statue of St. Louis, the director of sculpture and the advisory council of sculpture to pass upon said model. If the executive committee is correctly informed, the first model or design submitted was not satisfactory to the council. Another was made and accepted. The Exposition Company received the model and paid Mr. Niehaus the contract price therefor. This model was utilized, with certain changes, to produce the statue of St. Louis in staff which stood upon the exposition grounds.

"Toward the close of the exposition a movement was started by individual citizens of St. Louis to secure the perpetuation of the statue. The Exposition Company had no part in the movement. Correspondence was opened with Mr. Niehaus by the secretary of the exposition, acting in a personal, not official, capacity, for and at the request of these citizens. The letters which passed were in the nature of inquiries and answers as to the probable cost of reproduction. Mr. Niehaus visited St. Louis about the close of the

exposition and met one or more of the citizens who had interested themselves to preserve the statue. The conferences did not result in action. Up to that time the board of directors of the exposition had not only not entered into any negotiation with Mr. Niehaus, but had not considered the subject of reproduction of the statue of St. Louis. The committee which reported to the National Sculpture Society on June 19, 1906, was under a misapprehension as to the facts.

"Six months after the close of the exposition, when the movement by citizens had been abandoned because the estimates of cost were decided by them prohibitive, the board of directors of the exposition took the first step toward the reproduction by obtaining opinions as to the mechanical practicability of moulding from the staff statue an exact duplicate in bronze. Examination of the condition of the staff statue by experts led to the conclusion that the plan was feasible. The saff statue was shipped in sections to the bronze founders, and the bronze reproduction was accomplished."

To this letter the Society sent its final reply, which was approvéd by the Society's Council. It follows, in part:

"It seems to the National Sculpture Society that the misunderstanding which has arisen as to the right of the Exposition Company to use a work, temporarily constructed in staff for the use of the exposition, as a model for a permanent statue in bronze—against the protests of the sculptor who had furnished the model expressly for the temporary work in staff—is eminently one which the clause in the contract provided for in advance; and that the advisory committee is the most competent one possible to pass upon the construction of the arbitration clause itself.

"We cheerfully accept your correction that the secretary of the Exposition Company, Walter S. Stevens, acted in a purely personal capacity when he opened negotiations with Mr. Niehaus in regard to the permanent reproduction of the statue in question. But we fail to see that this is material, in view of your following statement:

" 'Six months after the close of the exposition the board of directors of the exposition took the first step toward the reproduction and that the staff statue was shipped in sections to the bronze founders, and the bronze reproduction was accomplished.'

"From this we infer that you assume entire responsibility, not merely for thus using the design—furnished by the sculptor for reproduction in light colored staff for temporary use—for a permanent statue in dark bronze, the workmanship in detail appropriate to which—especially the fineness of line and treatment of surface for the best light and shade effect—would be radically different; but also of now refusing to submit to the arbitrators named in your contract with the sculptor this misunderstanding 'which has thus arisen' as to the plastic sketches and models under this contract—this, though it was expressly stipulated by the contract that any such misunderstanding should be so referred.

"We must, perforce, accept this conclusion. But we regret that in any American city there should be set up for the art education or enjoyment of its citizens a bronze statue of such importance not more adequately modelled than by casting from a temporary enlargement in staff of a sketch made for that crude purpose—this after years of exposure and repeated coats of paint had further disqualified the staff enlargement for use as a model.

"Our criticism is that you have used a sculptor's work in a way not permitted by any fair construction of your contract with him; and also that in this you have so used his general design as to misrepresent his taste and workmanship, and thus attack his professional repute."

NASH AND HIS WORK.

IN the course of a paper on "Regent Street," read before the Architectural Association, February 8 last, Mr. Morgan E. Macartney, F.R.I.B.A., gave a brief life of John Nash, the originator and designer of Regent Street, as follows:

NASH was born in 1752, most probably at Cardigan, and as his parents were well-to-do he was placed with Sir R. Taylor, where he was a contemporary of Cockerell, Craig, Leach and others.

The following is a brief list of his principal works: In 1797-9 he carried out alterations at Corsham House, Wiltshire. The north front of this house is Tudor Gothic. The cost of the alterations was £80,000, so they must have been of an extensive nature. The grounds were laid out by Repton, who afterwards claimed the whole design for himself and his son, then in Nash's office.

In 1799 he designed Sunridge Park, Kent, in the Italian style.

In 1803 he was commissioned to design Killymore Castle, County Tyrone (cost £80,000).

In 1812 he re-designed Highgate archway, which, begun in 1811 as a tunnel 24 feet wide, had fallen in early in the year.

On August 1, 1814, there were held grand displays in the three parks in commemoration of the general peace. There were fireworks, miniature naval battles on the Serpentine, and similar festivities. As his contribution, Nash made a bridge and a Chinese pagoda at St. James's Park, and a Temple of Concord in the Green Park, which had first been suggested by Sir William Congreve. The bridge, although originally intended to remain for one night only, was afterwards strengthened by Mr. J. W. Hirst, and left as a permanent structure for several years.

It was at this time that Nash first came into contact with the Prince Regent, and gained his favor, thus securing name and fortune. Hence, when James Wyatt suddenly died, Nash was given temporarily the post of Surveyor-General, by command of the Prince.

For his patron Nash designed in 1814 the twenty-four-sided pavilion in the gardens of Carlton House, already noticed.

In 1816-18, in collaboration with Repton, he altered and enlarged the Opera-house in the Haymarket, adding an arcade and colonnade of cast-iron columns, since removed.

In July, 1793, his design won the premium offered for the Marylebone Park. The only terraces not designed by Nash are Cornwall Terrace and Munster Terrace, which was not built till 1827. He designed Park Crescent and Square, Albany Street and the adjoining streets, the Park viliages, and the outer road of the Park.

In 1813-16 Regent Street was designed and carried out; in 1816 he built Argyll Rooms; in 1819 the front of the County Fire Office, and the Quadrant. In 1823 he built his own house in Regent Street, moving thither from Dover Street, where he had previously resided. For this house he employed painters in Rome to make copies of Raphael's pictures in the Vatican.

He also combined into one uniform façade the façades of several shops. This practice was continued by subsequent architects.

The years 1826-8 saw the construction of the United Service Club-house, Pall Mall, and perhaps of Waterloo Place.

In 1825 Parliament made a grant for the repairing and enlarging of Buckingham House for George IV. On the strength of this Buckingham Palace was built, although the grant permitted no such extensive an undertaking. Nash was the architect. The "Marble Arch" was originally in front of the palace, whence it was removed in 1826. It is of Carrara marble, and cost £30,000.

Windsor Castle was also altered by Nash.

When St. James's Park was laid out in 1828, Nash was employed; but this was his last work of importance, for shortly afterwards he retired to Cowes Castle (I.W.), one of his own earlier designs. There he died in May, 1835, in his eighty-third year.

Contrary to expectation, he left but little property, though he must have made enormous sums by his profession. In his old age James Pennethorne, a relative, carried through his works for him. Among his pupils was John Adey Repton, and among his clerks were Pugin, Foulon and Morgan.

"Considered as a builder," said Mr. Macartney, "Nash showed his originality by his employment of stucco, the use of which he practically introduced, and of cast-iron columns, by which he anticipated the present enormous use of iron and steel in architecture; while if we regard him as an architect and artist, we must admit that if his details were poor his conceptions were grand and magnificent. But it is for his planning that he deserves particular commendation. I doubt if many of my audience are aware that a perpendicular let fall from the west end of Park Crescent would hit the south end of Park Lane. It is an excellent object-lesson, showing how to cut a series of parallel lines by a diagonal. A similar problem was set when the Charing Cross Road had to be made. The contrast between the two is only too evident. Regent Street is an ordered and satisfactory lay-out; Charing Cross Road is a hopeless jumble; in many places it is difficult to pick it out from the other lines of traffic, whereas Regent Street never loses its identity. Why is this? The answer is simple. In the one case the line of the street was laid out by an engineer, in the other by an architect."

EXCAVATIONS AT PERGAMON AND ELSEWHERE.

THE excavations which the German Archæological Institute undertakes every autumn at Pergamon are being carried on, says the New York *Evening Post*, as usual under the direction of A. Couze and W. Dörpfeld. Some of the finds will help to fill gaps in our present knowledge of the history of Pergamon. The work is going on at four different points. The greater part of the laborers are clearing the largest gymnasium of the city. This will be the third building of the

kind discovered at Pergamon. The two already known, situated on the south slope of the hill, were used by boys and youths for physical exercise. The newly found building, by far the most magnificent of the three, was devoted to the exclusive use of grown men. Of its many spacious halls, the most interesting is in the form of a Greek theatre, employed probably as an auditorium. Many pieces of sculpture which once adorned this gymnasium have come to light, but, unfortunately, in a rather mutilated condition. Herakles, the presiding deity of athletes, is honored with a number of statues.

Another task is the opening of several artificial mounds in the plain of Pergamon. The largest and most important is the Jigma Tepé, probably the burial-place of the Kings of Pergamon. This, as far as can be determined at present, has never before been opened, so that presumably it still contains its original treasure. Whether the excavators will be able this season to penetrate to the inner part of the mound, which is 50 metres high, seems doubtful. But a number of smaller mounds in this neighborhood have already been opened. In one was found a large stone sarcophagus. The man buried in it must have been a distinguished personage, as is shown by the two swords found at his side, and the beautiful gold wreath that once adorned his head. The wreath, made of gold ivy-leaves with a dainty little Eros hovering among them, is a work of the second century B. C. It will form one of the chief ornaments of the Museum at Constantinople.

A third group of men is busy with the remains of the bridge which once spanned the river Selinus. Already it has been ascertained that three arches of great size were used in this bridge. The myth that the arch is the invention of the Romans is still widely spread; it is of great interest, therefore, to find that at Pergamon this construction was used in various forms in the second century B. C., when Pergamon was still untouched by Roman influence.

Mr. Grüber, an architect, is investigating the remains of the ancient aqueducts. He has devoted much study to this subject, and he hopes this season to finish his researches. The number of aqueducts at Pergamon is astonishingly large, and some are of extremely interesting construction. Smaller excavations are being made to investigate the extent of the royal palaces which once crowned the summit of the citadel.

The progress made is considerable, but it will probably be many years before the citadel is all cleared. Then will come the task of laying bare the magnificent ruins of the lower town, where little has as yet been accomplished.

ILLUSTRATIONS

HOUSE OF BENJAMIN ARNOLD, ESQ., STATE STREET. ALBANY, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

HOUSE OF DR. H. P. JAQUES, LENOX, MASS. MR. G. C. HARDING, ARCHITECT, PITTSFIELD, MASS.

HOUSE ON SOLDIERS' PLACE, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

ITALIAN DOORWAYS: FIVE PLATES.

See article elsewhere in this issue for description.

Additional Illustrations in the International Edition.

ENTRANCE: HOUSE OF BENJAMIN ARNOLD, ESQ., ALBANY, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS.

NOTES AND CLIPPINGS

A POSTHUMOUS INSTANCE OF LORD GRIMTHORPE'S WILFULNESS.—Under the testamentary dispositions of the late Lord Grimthorpe, a legacy is left:—

"For a new clock in the Great Court [of Trinity College. Cambridge] to be made by Joyce of Whitchurch, or Smith of Derby, or Potts of Leeds . . . with my gravity escapement, and no figures on the dial, and either two or three larger bells, by Taylor of Loughborough, instead of the present bad ones, and a tubular weather-cock on the tower, like that at Batchwood [his house near St. Albans] to be made by Smith of Derby, and also for any necessary alterations to the building of that tower."

Trinity men will be very jealous of any interference with the clock. The tower mentioned by Lord Grimthorpe is, we presume, that on the north side of the Great Court, which now carries the clock and dial and a bell-turret.

THE FINE ARTS MUSEUM OF THE CITY OF PARIS.—The Petit Palais, so named in contradistinction with its big sister, the Grand Palais, when both were built in the exposition year, 1900, on the opposite sides of the Avenue Alexandre III., has been inaugurated four times. Nobody need be surprised, for it is well known that inaugural and dedicatory ceremonies are a sort of long suit in Parisian official circles. The fourth inaugural of the Petit Palais was on Tuesday, March 6, when President Fallières performed the ceremony. It will henceforth be known officially as the Fine Arts Museum of the City of Paris.—*New York Herald.*

BELLE ISLE TUNNEL SCHEME.—The project for a tunnel under the Straits of Belle Isle, the construction of a railway across Labrador under the Straits and to the east coast of Newfoundland, and a fast line of steamers to Europe, is now provided for by charter, and is engaging the attention of eminent engineers and railroad men. A franchise granted to the Quebec & Lake St. John Railroad gives the company twenty years for construction, and the Government of Newfoundland will give a yearly subsidy of $75,000 to the promoters. The construction of the tunnel under the Straits is not expected to cost more than $6,000,000. The Straits are not more than ten miles wide opposite Point Armour, and the water is less than 150 feet deep. The route to Europe is free from fogs, and the entire distance from the eastern coast of Newfoundland to the Irish coast is barely 1,800 miles. The promoters of the enterprise believe it would be possible to carry mails and passengers from New York to Europe by this route in shorter time than any other. Work may begin in the coming summer.—*N. Y. Times.*

GARGOYLE.—One of the earliest of the more elaborate attempts to transform roof spouts seems to have been at the Cathedral of Rouen, where the figure of a great dragon was adopted for one of them, though whether it was intended as an object of terror to the hobgoblin fraternity of the seventh century or a symbol of the Church's triumph over a public foe can only be conjectured. This fearsome wildfowl terrorized both banks of the Seine and terribly ravaged the city of Rouen until he was gallantly slain by St. Rominus, Bishop of the Cathedral there. Probably in sheer jubilation of spirit and in compliment to the valorous Bishop the carcass of the mischievous beast was embodied in stone and set up aloft as a warning to all depredators and any evil spirits by which they might be actuated. The name given to this unlucky animal is said to have been "Gargouille," and hence the name given to his effigy, according to some authorities. Others, however, derive the appellation from "gargoille," the weazand of the throat, or from "gargale," a disease to which swine are liable, and which causes a gurgling sound in the throat, like that which water makes in passing through a pipe. We are all at liberty to choose a derivation, since nobody can speak with authority. If gargouille really was the name given to some more or less fabulous beast whose carcass was imitated by some fanciful sculptor in the making of an ornamental spout, then the probability is that we have here the origin not only of "gargoyle" but of the French word for the weazand, as well as of the English words "guggle" and "gargle."—*London Globe.*

THE INSTITUTE GOLD MEDAL.—As the Council had determined on the presentation of the Gold Medal this year to an English architect, we are quite sure there will be no difference of opinion as to the suitability of the choice they have made. Mr. Belcher is a real artist in architecture, and has shown how an architect can be original in detail without losing sight of classic dignity and reserve of style, and without lapsing into eccentricity. We had certainly thought, however, that the time had come to show some recognition of the work of French architects. It is twenty-one years since the Institute Medal was offered to a French architect in respect of his executed works; the recipient on that occasion being Charles Garnier, who may be said to represent a past generation of French architects. Next year, at all events, we hope that the Council will recollect the existence of France, which seems at present to be architecturally a kind of *terra incognita* at Conduit-street.

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SOCIETIES, PERSONAL MENTION, ETC.

THE cancelling last week of the contract for an equestrian monument to General Sheridan in Washington, made between the sculptor, J. Q. A. Ward, and the Sheridan Statue Commission, is an occurrence interesting from several points of view. A correspondent of the New York *Times,* who believes in the French exordium *"cherchez la femme,"* turns to the Scriptures and finds there that a certain judge, being besought by a widow to avenge her of an adversary, would not at first do so, but at length, wearied by her importunities, decided that "Though I fear not God, nor regard man: Yet because this widow troubleth me, I will avenge her, lest by her continual coming she weary me." But we feel quite sure that Mrs. Sheridan, even if her dissatisfaction is the ultimate cause of the rupture, has shown all the good-feeling and forbearance that could properly be anticipated—and one could hardly expect that patience in such a matter should be put under strain for nearly twenty years. We feel that the blame can be more fairly placed upon the sculptor, or rather upon that too common disregard that all artists—sculptors more than painters—seem to feel they are entitled to pay to the conditions implied in their contracts. The general practice of artists too often seems to be precisely that followed by a certain class of mechanics and contractors: secure the job, do a little something upon it, and insist on a payment on account; the job is now "nailed" beyond peradventure, and the mechanic, contractor or artist then proceeds to "nail" other, and more and more, jobs in the same way, doing a little work on this, that or the other one as impulse seizes them. At this moment the Erie Canal Commission is trying to persuade a contractor who has in this way secured contracts on three different sections to do work upon one of them at least, and at the same time there probably is not a sculptor's studio in the city that does not contain unfinished work that should have been delivered long ago, while other jobs secured later have long since been finished and paid for. Of course, a reasonable leeway must be granted to the artistic temperament; and every one has experienced the feeling of physical repulsion at having to resume work on something that refuses to take proper shape; but most of us have to conquer that repulsion, and it would seem that during nineteen years Mr. Ward has had a very reasonable opportunity to get the better of his, and, as he has completed and submitted to the jury three different solutions of the problem, it must be granted that he has loyally attempted to do so. But it is obvious that, progressing at the same rate, the sculptor is not likely to be able to produce a satisfactory model, and the jury, the Government and Mrs. Sheridan have rights in the matter as real as the sculptor's.

THERE is at least one suggestion made by the City Improvement Commission of New York as to ways in which the aspect and convenience of that city may be improved that architects should set their faces against, and that is the proposal that the wall about Central Park shall be removed. In the first place, the removal of the wall on the Fifth Avenue side would be but the first step toward the widening of the avenue at the expense of the Park, and we do not believe that such widening will ever be really needful there. It is not to be disputed that access to the Park is not now sufficiently convenient; but the remedy clearly is not the abolition of the entire wall, but, rather, the interjection in its length of several or many new gates, and there is no more pleasing achievement of architectural art than a really successful park gateway or entrance. The fact that the gateways conceived by Mr. Olmsted and his co-workers never were built is no proof that such structures were not desirable, or that they may not yet be created, and, as we say, it is quite certain that they did not provide enough of them for convenient access to the grounds that are now so beautiful. If the present wall be retained and new openings made in its six or seven miles of length, it is plain that the existence of the wall and the treatment of the new openings will offer a standing opportunity and invitation for the erection there of statues and memorials of past and future notables of the town whose achievements and personalities, while deserving some public recognition, are not of such prime importance as to have claim to more conspicuous, isolated and individual sites.

RHADAMANTHUS could find no place on the New York Bench in these degenerate days, though Mercury, god of trade, commerce and chicanery, could, in the turn of a hand, disprove the immutability of law and justice, if the interest on a dollar is to be gained. The futility of incorporating restricting conditions in real-estate deeds was in part proved in Boston a few years ago by the court's rulings in the case of certain land lying on Beacon Street, near the State-house, and again disproved by contradictory rulings applying to lands lying in the neighborhood of the Massachusetts Institute of Technology. Stipulations of the same kind have lately been dealt with by the New York Supreme Court, which has decided that the conditions which restrict to dwelling-house use the land on Thirty-fourth Street, between Fifth and Sixth Avenues, need no longer be observed, and, so, the sites can be sold for the erection thereon of commercial buildings. It is true that the owners of seventy per cent. of the land petitioned for the removal of the restrictions, but it seems to us that the rights of the other thirty per cent., being founded on law and prescription, deserved the Court's upholding.

A VERY interesting case has been settled by the full bench of the Massachusetts Supreme Court in a way that should serve to stiffen the backbones of architects' clients hereafter. During the building of the great Christian Science Church, the leaders of the labor unions attempted to bring about, under threat of a general strike, the discharge of a non-union workman employed by the Aberthaw Construction Company. Hearing of the trouble, the Board of Directors of the Christian Science Church joined with the unions in the effort to effect the discharge of the guiltless, but obnoxious, workman. Upon this the Aberthaw people sued for an injunction against the labor leaders, by name, and the Board of Directors, praying not only for an injunction, but relief in damages. The case has just been decided in favor of the aggrieved contractors, and as to the behavior of the Directors, the Court in holding the corporation liable as an individual remarks: "The plans of the other defendants were well on foot when this defendant, who had been informed of their object, intervened and sought by its representations to persuade the plaintiff to avoid all future difficulty by discharging an employee who had not become obnoxious to them."

WE have not followed with close attention the struggle that has for months been going on in France between the State and the Church, but have been gratified to note that a *modus vivendi* promised to be reached shortly that seemed as nearly equitable as the opposing interests concerned made possible. But a rather serious hitch has just been encountered, and it concerns the point we spoke of when we referred long ago to the "separation" trouble, namely, the safety and preservation of the ecclesiastical fabrics everywhere in France—the world's heritage of architectural art. The French Government, at the last moment, incorporated in the agreement that it and the Vatican were about ready to sign a condition that the several priests who should sign the agreement that allows them to resume the exercise of their functions should bind themselves to keep the church fabrics in good repair! Naturally, the Vatican draws off before this exaction, a very serious matter in the case of cathedrals and large buildings, and always of importance in all buildings that have endured the weather for centuries, only through constant care. That the lessee should covenant to keep the leased building in good repair is an everyday occurrence; but it should be remembered that in these cases the lessor has just impoverished his would-be tenant by confiscating all, or practically all, his capitalized property, leaving to him only current income, and reduced at that.

AMONG the interesting things developed thus far in the investigation into the Pennsylvania Capitol scandal is proof that the architect, Mr. Huston, before the contract was awarded, assured the Capitol Building Commission that, allowing $675,000 for furnishing, decoration and his own commission, the building could be completed within the four millions appropriated. Another curious thing is that the Audit Company now engaged on the books, and in comparing the actual contents of this building with what purported to have been delivered into it, discovered that no interest had been paid on daily balances by the Trust Company with whom the building funds were deposited. A demand for such interest was therefore made, and $27,353 were recovered.

WE wonder whether Mr. Speaker Cannon, in view of the recent horribly disastrous freshets in Western Pennsylvania, will still hold the matter of the further denudation of the Appalachian and White Mountain ranges as quite immaterial and unworthy his consideration. To other observers the relation between what has just happened and the causes, at one time preventable, is entirely plain. It is partially reassuring to learn that the Government is to begin this summer to make a series of surveys and investigations of the present forestation of these watersheds, and perhaps enough facts can be secured in this way to compel Congress at its next session to take some effective action. Doubtless, President Roosevelt regrets keenly that he could not regulate the matter by executive order and erect these regions into "National forests" at the same time that he created a number of similar reservations in the Far West, last month. Unfortunately, the situations are not the same: in the West, the forests lately nationalized were still parts of the public domain, while, in the East, the Appalachian and White Mountain territory long since passed into private ownership, and the State or the National Government can only again secure control of it by ordinary private purchase or, at an appraisal, by exercise of the right of eminent domain. In any event, the cost of preserving and restoring these necessary forests is going to be very large; but, then, these Western Pennsylvania freshets which Mr. Pinchot, Chief of the Forestry Service, says were "due fundamentally to the cutting away of the forests on the watersheds of the Allegheny and Monongahela Rivers," have this year cost the afflicted neighborhood the value of at least three battleships.

ITALIAN DOORWAYS.—II.

THIS date reminds us that we are now in the full tide of the Renaissance movement, at least so far as Tuscany is concerned, and Tuscany, you know, was the very cradle of the newed Classicism. And yet, glance at the doorway of S. Agostino at Montepulciano—what a curious jumble of contradictory motives, while there is that about it that reminds us of the Porta della Carta. The designer was, perhaps, Michelozzo Michelozzi, the Florentine architect and sculptor, pupil of Brunelleschi, who in this very church erected the tomb of Bartolommeo Aragazzi. Michelozzo knew Venice and had worked at Ragusa on the Palazzo Publico there. Nothing is more natural, then, than that, inspired by Venetian architecture, he should, when called on to design a doorway for S. Agostino, at Montepulciano, try to recall and reproduce the flavor of the work noted during his sojourn in Venetia. This example is unique, and you must keep in mind that I have made my choice of artistic Italian doorways with a view to including among them not only those that are beautiful, but some that are somewhat odd, if not altogether extravagant.

DETAIL: DOORWAY OF THE SCUOLA DI S. MARCO, VENICE.

Now let us turn at once to the Renaissance. The question that may be put first to the historian may possibly be this: Did the Italian Renaissance have a doorway peculiarly its own, characteristic and fundamental in its architectonic style? Yes, it did, and among several varieties there exists one peculiar to the Renaissance in Tuscany—Tuscany, so fecund in architects, as the Duke of Urbino used to say—and the type of this doorway is found in the Sala d'Udienza in the Palazzo Vecchio at Florence. Having neither columns nor colonnettes, but only a moulded architrave and lintel, the mouldings at the base being returned horizontally—an especially characteristic feature of Renaissance doorways—the typical Tuscan doorway we are considering is enriched with an entablature and a semi-circular pediment enclosed within mouldings in keeping with the moulded architrave. The doorway of the Sala d'Udienza, a chef d'œuvre, as is the marquetry of the woodwork, with the portraits of Dante and Petrarch by Giuliano da Majano and Francione, designed in 1481 by Benedetto da Majano, is not provided at the crown of the arch and again at its springing on each side, where the corona projects beyond the extrados, with that ornament so distinctive of Renaissance doorways, a scroll supported by bean-pods (*gousses de fève*). Although lacking this characteristic, this doorway in the Palazzo Vecchio surely deserves the consideration of any one who is studying Renaissance doorways. Sometimes, as in the case of S. Giobbe, in Venice, the moulded architrave that enframes the doorway opening is itself included between a pair of pilasters which support a full entablature, architrave, frieze and cornice, the frieze being covered with sculpture, as are the faces of the pilasters. This doorway at S. Giobbe is an exquisite example and is allied to certain Florentine models, like that in the Badia designed by Benedetto da Pistoja, called da Rovezzano. The ordonnance, whether simple or complicated, of Tuscan and Venetian doorways here considered belongs to the *quattrocentesco* (XV. century) type, to which period also are to be assigned the rectangular doorways, such as that of the Palazzo Guidi, formerly Palazzo Fogliani, at Fermo, and the door on the south side of Sta. Maria della Rosa, at Lucca, so charming in its proportions. And although the process of simplification on the one hand may reach absolute poverty of

DOORWAY: PALAZZO ORSETTI, LUCCA.

DOORWAY: PALAZZO CALZAVEGLIO, BRESCIA.

expression, as in the doorway of the Palazzo Arroni, at Spoleto, on the other hand reaction may produce a very riot of ornamentation. And now we reach the doorway of the Scuola di S. Marco, at Venice, near SS. Giovanni e Paolo, which, expressing the sumptuous and joyous but elegant life of Venice, achieves an incredible richness. Everyone knows the building whereon this doorway, rather overloaded as a composition but carried out in a faultless manner, hymns the eternal refrain of Venetian beauty. Almost wholly burned down in 1485, the building was rebuilt in 1487, and in 1488 Pietro Lombardi, or Solari, the chief author of the doorway, was in charge of the reconstruction of the building, aided by Giovanni Buora d'Osteno. In brief, the doorway of the Scuola di S. Marco is a worthy companion of the "Porta della Carta," not far away. On this theme how much work has been modelled! I mean, how great a variety has been worked out after the ordonnances I have now enumerated. I have selected my illustrations so as to give the reader a fairly complete knowledge of the subject, but I have not attempted to convey any impression of the charm which is added to these Renaissance doorways by color, through the incrustation of red and green marbles, in the use of which Venice seems to hold the palm.

DOORWAY: PALAZZO BARTOLOMMEI, FLORENCE.

I must now direct attention to the doorway of the Palazzo Calzaveglio, at Brescia, a fine specimen of Renaissance doorway, combined with a twin window above, and the doorway of the Palazzo Sacrati, at Ferrara, a *chef d'œuvre* of the *cinquecentesco* (XVI. century) type. As to the Calzaveglio example, it finds its place in the midst of a curious painted façade and it is not certain to whom both doorway and façade should be ascribed, unless possibly to Antonio Zurlengo, a little known artist, who flourished in the last half of the fifteenth century.

As to the red marble doorway of the Palazzo Sacrati, its authorship is ascribed by Lanzi, but without proof, to the famous Sienese architect and painter, Balthazar Peruzzi. The accuracy of this ascription seems to me improbable, and, in the absence of documents, I am inclined to think that the name of Peruzzi should be displaced by that of Ercole Grandi, a Ferrarese painter. Whatever the truth may be, the doorway is magnificent, and its author, through giving rein to his fancy, leads us straight to the doorways erected at the end of the Renaissance period.

Italy has many of these, for at that time building was going on in the country with feverish haste, especially in the matter of houses and palaces. Columns, consoles plain and consoles scrolled, consoles inclined or reversed, corbelled consoles, caryatides male and caryatides female, cartouches either plain or scrolled, coats-of-arms and escutcheons displaying the most singular of artistic movements, these are a part of the architectural language in the closing days of the Renaissance, and in the Baroco and Rococo periods delirium went even farther.

DOORWAY: PALAZZO GIUGNI, FLORENCE.

DOORWAY: PALAZZO FENZI, FLORENCE.

The doorway of the Palazzo Giugni, 1577, at Florence, by

Bartolommeo Ammanati, is a pretty composition, that marks well enough the last of the work purely Renaissance in style. The more delicate proportions of the doorway of the Palazzo Bartolommeo, by Girardo Silvani, give it an air of lightness that pleases the eye, and the doorway of the Palazzo Fenzi, also in Florence, with the balcony above it, just as the others have, is one of the most famous in the city of Michael Angelo, and the author is the same Silvani, though the sculptured consoles are the work of R. Curradi, who displayed in them a remarkable vigor and energy.

Those of my readers who have a fancy for studying Baroco doorways should go to Rome, to Naples, to Genoa and above all to Turin, where, more than in any other city in Italy, they will find what they seek. ALFREDO MELANI.

THE PERMANENCY OF RESTRICTIONS ON REAL ESTATE.

IN the case of Evans *vs.* Foss, a suit to prevent the erection on Newbury Street, Boston—in the residential West End section—of a large garage for public use, the plaintiff basing his case on certain limiting conditions stipulated in the deeds common to that section of the city, the full bench of the Massachusetts Supreme Court, in affirming the verdict for the plaintiff, said a week or so ago:

"IT is a familiar principle of law, which has been applied in many cases, that when one makes deeds of different portions of a tract of land, each containing the same restriction upon the lot conveyed, which is imposed as a part of a general plan for the benefit of the several lots, such a restriction not only imposes a liability upon the grantee of each lot as between him and the grantor, but it gives him a right in the nature of an easement, which will be enforced in equity against the grantee of one of the other lots, although there is no direct, contractual relation between the two. Through the common character of the deeds the grantees are given an interest in a contractual stipulation which is made for their common benefit.

"While not all the conveyances made by Whitney and others, trustees, of lands in this vicinity were put in evidence, there was nothing to show that this restriction was not inserted in their conveyances of the lands out of this third parcel, as a part of a general scheme for the benefit of the whole property, and there was enough in the evidence to show that it was so inserted. The fact that in some conveyances of parts of their large purchase there were also other restrictions, does not tend to show that this restriction was not intended to apply alike to all, for the benefit of the purchasers. The restriction is therefore valid and enforcible against the defendant.

"The proposed garage is designed to accommodate about 125 automobiles of the larger type. A steel tank enclosed in cement is arranged under the front of the building to hold the barrels of gasoline. The second floor is designed to be used partly for the storage of automobiles. The rear of the third floor is designed for a repair-shop, for making minor repairs of automobiles. The dimensions of this repair-shop are about 100 feet by 30. The southeast corner will contain a small, portable forge. The size of this room is such that from six to eight cars of the largest type may be repaired simultaneously. A number of demonstration cars are to be kept, with demonstrators to run them for possible customers. The building is also intended to be used to store and care for automobiles belonging to customers. About 75 to 100 customers are expected to store their automobiles here, and these automobiles go in and out on an average of once each day.

"The Judge [in the court below] found that the erection and maintenance of such a garage would be a violation of the restriction. The findings of a judge, made upon the testimony of witnesses who appeared before him, will be followed by the full Court unless they are plainly wrong. In the present case, while there was some conflict in the testimony, we are of the opinion that the finding was right. There was much evidence tending to show that the business proposed to be carried on at the building would be 'offensive to the neighborhood for dwelling-houses.'

"The remaining question is whether there has been such a change in the conditions as to preclude a court of equity from enforcing the restrictions. The Judge found, and there is no doubt of the correctness of the finding, that the restrictions in question were imposed by Whitney and others, trustees, in 1886, for the purpose of keeping this property as a residential property, as being the use for which it was then believed to be best adapted. In the present case no use has been shown, of any part of the property on which the restriction was put, that is in violation of the restriction. There has been a considerable increase of business lately in Massachusetts Avenue, which is a great thoroughfare. A part of Newbury Street between Massachusetts Avenue and Hereford Street was originally left unrestricted, and stables were built there. The proximity of the Boston & Albany Railroad diminishes the desirability of a part of the property on Newbury Street for residences. But these conditions, except the increase of business on Massachusetts Avenue, existed in 1886, when Whitney and others, trustees, made their conveyances. In the absence of any material change in conditions directly affecting the character and use of the property in question, this Court cannot refuse to enforce the restriction on the ground that it has ceased to be binding. The Judge in his finding expressed an opinion that in ten years this part of Newbury Street 'will be wanted to business purposes' and is 'worth more for such purposes than for residential purposes.' Whether this opinion as to the future is well founded or not, it is not a good reason for depriving those who have built dwelling-houses on their lots in reliance upon the restrictions of their right to have the adjacent property used in accordance with the provisions of their deeds. Judgment for the plaintiff."

ALBERTI AND PERUZZI.

IN the course of a Royal Academy lecture on "Design and Temperament," Mr. R. T. Blomfield, A.R.A., the new Professor of Architecture, said recently:

The architect was regarded with singular contempt by the Greeks in so far, as it has been said, as he fell short of a gentlemanly leisure. The Romans inherited this feeling and carried it on, and it was not until a new vitality was brought from the East that they had that individualism which was to bring about such tremendous developments in architecture, for example, St. Sophia. Their own conditions of life were so remote from those of Justinian that they could not read backward from the building to the men who designed it. When that splendid civilization of Byzantium died, there was a throw-back in the West to a state of things not far removed from barbarism. The early mediæval architecture grew up by collective effort rather than individual, and they knew little of the men who did the work, but whereas the architecture of the ancients—perhaps he should say of the archaic world—was hieratic, in the Middle Ages they found individuality steadily making its way to the front; yet it was not until the Renaissance that the material for what one might call the physiological study of architecture—the interpretation of the architect's work by his personal temperament—was available. He would take Alberti as an example. Alberti was born of a noble Florentine family, and was a gentleman, a scholar, a man of admirable accomplishments, both mental and physical, one who found something to delight in in every condition of life. The result of this combination of qualities was traceable in his architecture. There were two sides to his character—the austere reserve of the scholar and the fastidiousness of the fine gentleman, on the one hand; and on the other the adventurous instincts of the sportsman. The Renaissance in its first inspiration was a movement of scholarship, but so far as architecture was concerned it began at the wrong end, in regard to the fact that it worked deductively from such writers as Vitruvius, instead of inductively from the facts of construction, and in the first instance Alberti approached architecture from the point of view of the scholar, and his enthusiasm for the antique led him into difficulties from which a more intimate study of architecture would have saved him. But the instincts of the adventurer were not less strong than those of the scholar, and the fact that he attacked the problems of construction was characteristic of a man who was determined to go beyond the beaten track. His distinction of mind was visible in his architecture. It was not always pleasant, but it was a serious attempt at individual expression, and the qualities he aimed at were not to be mistaken in his work. Let them take the Church of S. Francesco at Rimini. It was a Gothic building of brick, highly unsatisfactory to that fierce mixture of humanist and war-wolf Malatesta, who found his man in Alberti. Alberti transformed it into the Roman manner, and filled the inside with marbles and sculpture and heathen gods. Few buildings were more characteristic of the earlier Renaissance—it was an attempt to translate modern thought into terms of Paganism, and it seemed to a certain extent that this was always at the back of Alberti's mind. So, too, with St. Andrea, at Mantua, which, although much altered, was still one of the finest churches of the Renaissance. The church in its

present state was by no means as Alberti designed it, but it was characteristic of the man. In Alberti, then, they were brought face to face with a new type. In Greek and Roman civilization the architect was an inferior, little more than a servant; in mediæval days he was lost in the crowd; but in Alberti, for the first time, they came across a man of high position and high education who devoted himself to architecture for the simple love of art, and who was able to show in his own work the quality of reserve and personal feeling and contempt for trivialities which marked him out amongst men. To estimate the value of his work it was important to bear in mind what was being done by other men at the same time. While they were occupied with detail, Alberti, alone almost amongst the men of his time, was thinking in terms of architecture and endeavoring to give to architecture its own peculiar qualities, and making an appeal by form and refinement, and, above all, beauty of scale. More than that, he saw life whole, as compared with the type of the professional gladiator whose whole life is given over to professional success.

He would call attention to another man of the Renaissance. Peruzzi, as was the case with Alberti, was drawn into architecture accidentally. He worked for a time in a goldsmith's shop, and settled down to the study of painting at an early age, and speedily obtained employment in the decoration of buildings. But the true artist of the Renaissance never rested, and each fresh attainment was merely a stepping-stone to future efforts. He devoted himself to the study of perspective and the antiquities of Rome, and then almost drifted, as it were, into the practice of architecture. It was evident from his work that he had carried his researches into antiquity to a much more intimate point than any of his contemporaries, but few things were more surprising in his work than the way in which he arrived at a refinement of detail and a selection of form which had more of the true Greek spirit than had the revivalists of 100 years ago, and in this regard Peruzzi stood almost alone amongst the architects of the Renaissance. He alone saw the possibilities of Greek detail under the brilliant sky of Italy. Peruzzi dealt with the traditional forms of Classic architecture with the competent freedom of the master, and they found this not only in details, but in his whole attitude to architecture. Detail to him was a means to an end—that of driving home the central idea of his building. The work and lives of both Alberti and Peruzzi showed how intimately connected were the artist and his temperament. It was refreshing to turn back now and again to the time when art for art's sake meant something very different from what it meant in recent days; to the time when a man of great ability and position like Alberti found in architecture the work of his life, and an artist of the ability of Peruzzi ignored the onus of fortune in his pursuit of the least popular of the arts. He had selected them as types of the artist whose aim was steadily to consider the finer qualities of life. It was their privilege as artists to follow them in this, and, in whatever circumstances they found themselves, to watch and see that they realized the finer and rarer qualities of life—to play the part of the interpreter, and even it might be the seer. It was the function of the tradesmen to satisfy the fashion, but it was their business as artists to see farther ahead and disentangle the permanent interest ever in their small corner of existence, and endeavor to render it vital for all kindred spirits.

THE APPLICATION OF STONE PRESERVATIVES.

THE causes of decay in stone are partly chemical and partly mechanical, and may be generally traced to absorption of water, so that any contrivance or solution that will check the admission of water will be most likely to succeed in arresting decay. It is doubtful whether there is anything better for stone buildings than clean water supplied by means of a hose from a fire-engine, or in some such way. The use of the sand-blast, and all reworking of the face of the stone, by chiselling, dragging, rubbing by sand and water, or pumice-stone and water, are now considered to be a mistake, as on the "skin" of the stone being removed the "pores" are opened and disintegration and decay ensue. It is when the "pores" become filled with water, and then exposed to the air that chemical action takes place. Mechanical action takes place when the moisture in the stone becomes frozen, causing the cementing matter of the stone to expand, when disintegration takes place.

In France a composition for cleaning stone has been introduced under the name of "Lithol." Various substances are added to the usual hydrochloric acid in order to render its use less dangerous and more effective. Five grammes of bisulphate of soda are dissolved in one-tenth litre of warm water; five grammes of powdered cream-of-tartar or bi-tartarate of potassium are dissolved by shaking in 235 grammes of hydrochloric acid and one-tenth of a litre of water is then added. These two solutions are then mixed, when a certain amount of sulphurous acid will be envolved; 35 grammes of oxalic acid are dissolved in half a litre of water at 140° F., and added to the previous mixture, and then the whole is filtered. These operations may be carried out in glass or enameled vessels. The solution should not be left unstoppered, as in time the sulphurous acid would be changed to sulphuric.

There have been many nostrums tried with more or less success to remedy decay in stone. On some parts of St. Paul's Cathedral, and especially on the under side of the coping stone round the base of the dome, there is a deposit of a grey or black substance which here and there is three-quarters of an inch thick. It can readily be powdered, and under the microscope shows no trace of organized growth. According to the analysis of E. G. Clayton, F.I.C., it has the following percentage composition: Water, 24.54; calcium phosphate, 2.22; calcium silicate, 1.63; magnesium silicate, 0.67; iron silicate, 2.40; and sand and uncombined silica, 8.06. The deposit, therefore, consists mainly of calcium sulphate hydrated together with some siliceous matter. This main constituent is supposed to be chiefly formed by the action of the sulphuric and sulphurous acid in the smoke from the surrounding chimneys upon the stone, assisted by action of rain. The decaying of the stone in Westminster Abbey has been going on for some years, and has been the subject of many experiments to ascertain a suitable preservation.

Soapstone is a material which possesses what may be regarded as extraordinary qualities in withstanding atmospheric influence, those especially which have so much to do with the corrosion of iron and steel. It is said that no other material is capable of taking hold of the fiber of iron and steel so readily and firmly as this. In China, soapstone is largely used in preserving structures built of sandstone and other stones liable to crumble from the effects of the atmosphere, and the covering with powdered soapstone in the form of paint, on some of the obelisks in that country, composed of stone liable to atmospheric deterioration, has been the means of preserving them intact for hundreds of years.

Common drying-oils, a mixture of linseed oil and sulphur, linseed oil and beeswax, solutions of various gums and resins have been used with varying success. Oil has been used with considerable success, when applied thin, when the stone is perfectly dry, or a solution of common soap dissolved in boiling water, allowed to dry, and then a solution of alum dissolved in water applied. The lower mouldings, and the tops and under parts of cornices and string-courses, are most liable to decay, owing to the water filtering through the stone. The application of oil to these surfaces would prevent the water sinking into the stone, and obviate to some extent the tendency to decay.

An attempt to make mortar water-tight by using silicate of soda and soap and alum with cement has been tried. It was found that the effect of the silicate of soda diminished the strength of the mortar about 50 per cent. and diminished the absorption of ash mortars about 50 per cent. The soap solutions alone did not increase the strength, but decreased the permeability about 50 per cent. The effect of alum and soap strengthened the mortar and hardened it, with 50 per cent. decrease in absorption. A 5 per cent. solution of ground alum and water, and a 7 per cent. solution of soap and water was used. The alum water was mixed with the mortar in the proportion of one-half the ordinary gauging water; the soap solution was then applied to bring the mortar to the desired plasticity. The soap and alum acting together cause the precipitation of an insoluble compound in the pores of the mortar.

Lime wash has been used at Exeter Guildhall as a preservative for the stone, but this is said to arrest decay only until the protecting coat of lime is eaten through. The lime was slaked with boiling water, which resulted in its penetration of the stone farther than when the lime was slaked with cold water, and adhered firmly without the addition of Russian tallow. Professor Church, however, contends that lime wash is objectionable, as, although it undoubtedly acts for a time as a preventive of further attack by sulphuric acid (provided it keeps its place on the decayed and crumbling walls), it must give rise to more sulphate of lime, the very substance the formation, presence and migration of which have been the chief cause of the decay. Professor Church suggests that if lime wash be used at all it should have precipitated carbonate of baryta as the chief ingredient, the baryta

being as effective as lime in keeping out the corrosive sulphuric acid, while it can add no injurious soluble salt to the decayed stone. Large blocks of stone used for ordinary building purposes very frequently have a number of minute—microscopic—fractures running through them, for a short distance, which considerably weaken the stone as a whole, and water finding its way into them soon produces disintegration.

Precipitated carbonate of baryta for the prevention of scum and discoloration on facing bricks, terra-cotta, tiles, ridges, quarries, etc., has been successfully used.

The application of baryta water is undoubtedly the best known treatment for arresting the decay of stone. It has been used with conspicuous success at Westminster Abbey by Professor Church. A solution of hydrate of baryta repeatedly applied in dry warm weather, with suitable precautions, scarcely changed the color of the stone, it formed no skin, penetrated deeply and served to render solid once more disintegrated stone where damaged by the formation of sulphate of lime by turning this soluble compound into soluble sulphate of baryta, at the same time setting free caustic lime which in course of time becomes carbonated into chalk.

It is to these changes that the hardening and consolidation of the decayed stone are mainly due, but it may be weeks, or in some cases months, before the process is complete. The baryta water is applied preferably with a diffuser. The experience of four years has indicated that the baryta treatment involves no risk of bad consequences, though it is possible that after the lapse of a few years a further application of baryta may be required.

A preparation called "Fluate" has been on the market some time; it renders stone and brick water-proof, is colorless, and does not affect the look of the material to which it is applied. The effect is said to be permanent. Cost of labor and materials is computed at about 1 1-2d. per foot of surface treated.—*A. C. Passmore in the Stone Trades Journal.*

THE PRESERVATION OF HISTORICAL MONUMENTS.

NOW that legislation is urged seeking to protect the Old State House against future vandalism, says Mr. Hazard Stevens in the *Boston Transcript*, it is interesting to note the action of other countries in preserving ancient and artistic monuments and works of art in which some of these are so rich.

In Rome a commission of fine arts is charged with this duty. Individuals are prohibited from demolishing or damaging ancient monuments, even on private property, and throughout Italy are forbidden to sell paintings and other works of art to be exported without the permission of the proper authorities. The Italian Government is now preparing a general catalogue with descriptions and photographs of all ancient historical buildings.

In Greece there is an inspector-general of antiquities. All persons are forbidden to destroy, alter or even repair in any manner, ruins or any kind of ancient monuments without special permission of this official, who is authorized to undertake necessary repairs at the expense of the State. No person is allowed to quarry stones or erect lime kilns within 500 metres of any ancient building, or to do anything to endanger such, even though private property. And statues, vases, etc., found on private property are assumed to belong to the State unless the contrary is shown, and none of the art treasures may be exported without governmental permission

In Austria an Imperial and Royal Central Commission for the Investigation and Preservation of Artistic and Historical Monuments sits at Vienna, and is assisted by conservators and correspondents in the provinces. In France, under the direction of the Minister of Public Instruction and Fine Arts, all historical buildings and monuments have been scheduled and placed under the protection of a Commission of Historical Monuments.

Spanish monuments have enjoyed the protection of the State from an early date. A commission in each province, dependent on the Royal Academies of History and Fine Arts in Madrid, is charged with this duty.

Bavaria has as its Board of Trustees of Bavarian Artistic and Ancient Monuments, six members, of whom four are authorities on the history of art, one an architect and one an artist.

The Belgian Royal Commission on Monuments consists of a central committee of twelve at Brussels and for each province a committee of correspondents at the chief town, presided over by the governor of the province, 186,000 francs being voted annually for the preservation and restoration of monuments, etc. In the Netherlands, large sums are annually appropriated for restoration and repair under the Department of Arts and Sciences.

Switzerland makes an annual grant of 50,000 francs for the acquisition and preservation of national monuments under the Federal Commission for the Preservation of Swiss Antiquities. Saxony has a Commission for the Preservation of Monuments. Denmark has a Royal Commission, with an annual grant.

In Sweden and Norway, the law provides that "all fixed remains which preserve the memory of the ancient architects of the country are placed under the protection of the law and may not be injured or destroyed by the owner of the land, etc.

Thus it appears that in these countries ancient buildings and monuments and works of art are placed under the protection of stringent laws, some of them encroaching upon private rights of property in a way that would be unconstitutional in this country, and commissions whose members are the first historians, architects and artists, and with liberal grants of money from the state. In the United States, too, patriotic citizens have taken the lead in this work. Independence Hall in Philadelphia has been completely restored and dedicated as a patriotic memorial of the Declaration of Independence. Valley Forge and Washington's Headquarters have been purchased and preserved by the State of Pennsylvania.

New York has secured Washington's Headquarters at Newburgh and a monument at Saratoga. Fraunce's Tavern in New York City, the scene of many Revolutionary events, and where Washington laid down his commission as Commander-in-chief at the close of the Revolutionary War, has been purchased and restored by the Society of the Sons of the Revolution at a cost of $140,000. In New Jersey, the battlefield of Monmouth and Washington's Headquarters at Morristown have been purchased, partly by State funds and partly by private contributions. The State grants $2,500 a year for their care. The State has also contributed most of the funds for the battlefield monument, costing $50,000. Ohio exercises control over places of historic interest—Forts Recovery and Defiance, the Eagle Earthworks in Licking county and Fort Ancient in Warren county, the latter two prehistoric earthworks of the mound-builders. She maintains an archæological and historical society for the preservation of historical monuments.

The United States Government has erected monuments to Washington, to Washington's mother, one to mark his birthplace, a noble shaft to commemorate and mark the surrender of the British army under Cornwallis at Yorktown, numerous statues in Washington to Revolutionary worthies and men distinguished in the forum and the field subsequently, and has set apart as national parks and suitably cared for the fields of the great battles of Antietam, Gettysburg and Chickamauga. Mt. Vernon, the home of Washington, and his tomb, the finest shrine of all, were saved and restored by the patriotic women of America.

Massachusetts has not been behind her sister States in this filial and sacred duty. Bunker Hill Monument, the first, finest and most celebrated of all the Revolutionary mementos, the reservations of ground, the monuments and statues at Concord and Lexington, the Civil War monuments in nearly every city and town, the Old South Church and Paul Revere Home, saved by private contributions, all attest her reverence and pride in her glorious past.

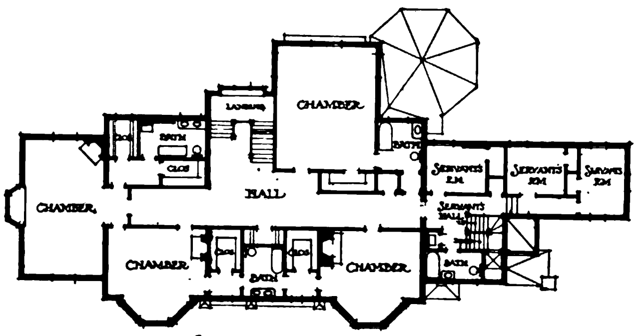
Her most venerable and priceless monument, the Old State House, has been almost irreparably damaged by the Transit Commission, which drove a sidewalk tunnel through the east end and turned it into a railway station. But now the General Court is considering a bill to render impossible such vandalism in the future.

ILLUSTRATIONS

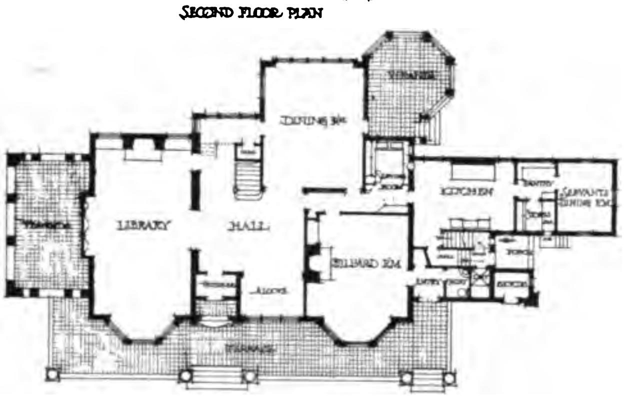
THE VAN LEW MANSION, RICHMOND, VA. MEASURED AND DRAWN BY MR. H. E. MARKLEY, PITTSBURGH, PA. TWO PLATES.

These two plates represent the first fruits of a traveling studentship, devoted to preserving a record of the still surviving examples of the Colonial architecture in this country, that has been established by the Pittsburgh Chapter, A. I. A. At present the undertaking rests on somewhat precarious grounds, but as the same unidentifiable gentleman who provided the needful funds for the first year's expenses has duplicated his gift for the coming year there seems to be a possibility that a permanent foundation may be secured. It is evident, however, that much must depend on the abilty of the early holders of the studentship to "make

good." We can hardly feel that the choice of subject in this case has been a happy one, for though the house of Miss Van Lew, the famous "Union spy," has a certain historic interest, that interest certainly does not date back to Colonial times, while the structure itself is late in date and not especially typical.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF GEORGE C. BUELL, ESQ., EAST AVENUE, ROCHESTER, N. Y. MESSRS. BRAGDON & HILLMAN, ARCHITECTS, ROCHESTER, N. Y.

ITALIAN DOORWAYS. THREE PLATES.

NO. 142 BIDWELL PARKWAY, BUFFALO, N. Y. MESSRS. ESENWEIN & JOHNSON, ARCHITECTS, BUFFALO, N. Y. HOUSE ON DORCHESTER ROAD, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

PORCH: NO. 142 BIDWELL PARKWAY, BUFFALO, N. Y. MESSRS. ESENWEIN & JOHNSON, ARCHITECTS, BUFFALO, N. Y.

Additional Illustrations in the International Edition.

HOUSE OF W. H. GLENNY, ESQ., DELAWARE AVENUE, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

THE ACCOUNTANTS' INSTITUTE, LONDON, E.C., ENGLAND. MR. JOHN BELCHER, R.A., ARCHITECT.

THE HALL: "CORNBURY PARK," ENGLAND. MR. JOHN BELCHER, R.A., ARCHITECT.

THE ITALIAN GARDEN AT "CORNBURY PARK," ENGLAND. MR. JOHN BELCHER, R.A., ARCHITECT.

NOTES AND CLIPPINGS

DORPFELD FINDS A HOMERIC CITY IN ITHACA.—The announcement that Wilhelm Dorpfeld, head of the German Archæological Institute at Athens, has discovered in the island of Ithaca what he considers the remains of an Homeric city has created great interest among archæologists. Remnants of walls and of monochrome-decorated earthenware were found, as well as a number of more elaborately ornamented vases. Three hours' distant from the ruins of the city was found a cavern containing evidences of prehistoric inhabitants. Under the Convent of St. John Herr Dorpfeld found a temple with Doric and Ionic columns.—*Exchange.*

THE KLEPTOMANIA OF THE LATE ALBERT THOMAS.—Whenever a misdeed can be ascribed to an architect, he receives scant mercy from journalists. The outcry against the late Albert Thomas is an instance. The unfortunate man was one of the architects of the French Government, he was an officer of the Legion of Honor, and until two years ago he had charge of the Grand Palais, part of which was erected from his design. He had obtained the Prix de Rome in 1870, and for many years he was much respected. Unfortunately, of late years he was affected by a common form of mental disease—kleptomania. Finally, he became paralyzed, and in that state he had no recollection of what he had done. From his official position he was allowed access, not only to the national archives, but to the collection in the École des Beaux-Arts. M. Lesoufaché, the architect, had enriched the latter with drawings and engravings of eighteenth century architecture, including original drawings by Blondel. M. Thomas, either with or without permission, was allowed to take many of the volumes and portfolios to his own house. Having temporary possession as if they were his own property, he cut engravings from the volumes to which they belonged, in order to arrange them on a different plan. After the death of M. Thomas a part of his library was sold, and the bookseller who purchased them was not long in perceiving that some books were national property, and returned them to the library of the School. Madame Thomas made a further search and discovered thirty-six other volumes, which were also returned through the agency of M. Bonnat, the painter. An official inquiry is now in progress. M. Thomas was a candidate for election to the Academy of Fine Arts, and it is not to be supposed that any sane man who was ambitious of that distinction would run the risk of robbing an institution which is so closely connected with the same Academy. His mania for acquiring things was latterly so strong that he took possession of an iron gateway and, as one of his friends remarked, he would have carried off the two towers of Notre-Dame, if the task were feasible. Architects have no immunity from psychological degeneracy; they must share in the common lot, and when so distinguished a representative of the profession as the late M. Thomas lapses, his fall should give rise to pity rather than to the creation of slanders.—*The Architect.*

DECAY OF THE CHOLULA PYRAMID.—The residents of Cholula, in the State of Puebla, are alarmed over the cracking of the historic pyramid of Cholula and the impending destruction of the temple. The crack in the pyramid extends a long distance and is twenty centimetres wide. The weakening of the pyramid is due to the decay of its base, caused partly by the taking away of earth from the support with which to make adobes. The chaplain has invoked divine protection. Professor Leopold Batres, Inspector General of Archæological Monuments, has gone to Cholula to make an examination of the premises.—*Mexican Herald.*

REINFORCED-CONCRETE MINE PROPS.—Props of concrete are being used in coal and other mines successfully and economically in the place of lumber. A great deal of lumber is used in mines as supports in the galleries and drifts, and the atmospheric conditions in the mine interior make it necessary to renew this wood frequently. With the props made of cement, the first cost is the only one, for once they are placed they are there for all time. The cement props are made at the mouth of the mine, and being reinforced with metal, they are not nearly so bulky as those of wood, which is often an important consideration. It is said that their cost is half that of wood. The Reading Coal and Iron Company has adopted concrete for this purpose and has equipped a plant for making the props.—*New York Tribune.*

REFORMING THE PLACE DU CARROUSEL.—M. Redon, the architect to the Louvre, has conceived an interesting scheme, which has the approval of the Government, for the treatment of the Place du Carrousel. He proposes the formation, at the two ends of the central space, of two fountain basins like those on the terrace at Versailles, and decorated, like those, with groups of sculpture, not sufficiently high to interfere with the perspective. These groups have already been commissioned from M. Injalbert. To complete the decorative scheme, the surrounding space will be laid out in lawns and parterres, with electric candelabra placed among them. In front of the Carrousel arch will be erected figures bearing crowns and symbolical in general of military glory; for these M. Frémiet is to be responsible. As a central *motif* a figure of Liberty, to be executed by M. Mercié, will form a kind of pendant to the Gambetta Monument. Behind this monument the existing square will be transformed into a *bosquet* dedicated to the Arts; the statues of Poussin, Watteau, Puget, Rude, Pierre de Montereau, Mansard, and others will be relieved in front of a wall of verdure, as in the French Gardens of the old style.—*The Builder.*

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SOCIETIES, PERSONAL MENTION, ETC.

IN the course of his report on the manner in which the new architects for the Luzerne County, Pa., court-house propose to finish the interior of that building, which has been entrusted to their care through the dismissal of the original architect, Mr. J. V. Van Pelt introduces an admonition so aptly put that it is worth while to quote the paragraph in full. To judge by the context, the architects would seem to have intimated that a certain saving in cost might be effected by using here and there, where likely to escape attention, a cheaper finishing wood, and against this course Mr. Van Pelt warns the County Commissioners as follows: "I should call your attention to the fact that while using a cheaper wood in these rooms might be considered an important reduction in cost in a private residence, any large reduction of cost in an important public monument, such as the court-house, can only be attained through a radical change in the more important portions of the building." This very happily draws attention to the iniquity of applying to matters of public art the makeshift economies that elsewhere find an excuse in private exiguities. Many of our costly public buildings have been ruined because the authorities, not having at hand an unbiased critic they could trust, have compelled, or consented to, the introduction of cheap and sham work in interior finishings—the very portions, that is, that come under the leisurely survey of the observer. This same point is very well covered in another column by Mr. Hoyt's paper on "Scagliola." It would not be fair to leave the Wilkes-Barre court-house matter without letting it be known that Mr. Van Pelt affirms his belief that the new studies for the interior treatment of the building are "immeasurably better than the old ones."

THE one wholly incomprehensible feature in the astounding developments now taking final shape in the Pennsylvania Capitol matter is that any men, no matter how morally callous, should have had the "gall"—no other word is sufficiently expressive—to go on with the "per pound" and "per foot" system after the first accounts came to hand and revealed indisputably in figures the enormity of the stealing that was in contemplation. Public attention seems to have been caught particularly by the evidence that the State, under the "per foot" rule, had to pay for the two rostra in the Senate and House "caucus-rooms" $90,748.40, while Sanderson, the contractor for furnishing, paid the sub-contractor who actually built them only $2,060.00! The story told by these figures is confirmed by the camera, which reveals that each rostrum appears to be a platform perhaps six feet by twenty, having a rather plain paneled desk in the middle, and approached at either end by a straight run of five risers. These steps are provided with square moulded and paneled posts at top and bottom of the run and with one (Classic) baluster to each of the three treads, while four other balusters support the rail on the platform itself. Fourteen balusters in all constitute, then, the salient architectural embellishment of these costly rostra, executed to be sure in mahogany, and kept in countenance by a moulded and bracketed hood or baldachino above the platform. This verbal description will add to the bewilderment caused by the figures given above, and will convince the reader that those who audited and paid the accounts must have had a reason for their action that should be traceable in their private bank accounts.

PUT in tabular form, the comparative cost and real value of some of this "furnishing" work at Harrisburg, as revealed by the evidence, make a really very impressive indictment; thus, in the first column we state the sums actually collected from the State by Sanderson, in the second column the sums paid by him to his sub-contractors for doing the same work, and the net profit in the third.

Woodwork in Fourteen Rooms	$155,369.60	$28,724.00	$126,645.60
Rostra in Caucus Rooms	90,748.40	2,060.00	88,684.40
Mosaic work about Rotunda	28,759.20	7,244.00	21,575.20
"Bacarat glass" globes, etc	138,757.09	27,329.90	111,427.19
Decorative work, various	779,472.96	162,289.85	617,083.11
Bronze work	2,187,122.90	605,851.17	1,581,271.73
Bootblack stand	1,619.00	125.00	1,494.00

WITH the architect of the Pennsylvania Capitol dangling before the eyes of an astounded people as an archetype of the American architect of the day, it really seems to us that the present is not just the time that prudent architects should choose for seeking at the

hands of their fellow-men anything in the nature of special privilege, and no one can deny that the proponents of the license laws are seeking special privileges, and they are seeking them under false pretenses, alleging that they are influenced solely by a desire to promote the safety of the public. Yet the testimony is that this Capitol at Harrisburg is, as a structure, well built; it is not likely to fall down, and so the safety of that portion of the public that visits or uses it is not likely to be endangered: it follows, therefore, that the designer of the building would have been able to pass his examinations and secure his license. But it seems to us that the history of this building shows impressively that, if a State is going into the licensing business, it might be well to extend the examinations beyond the field of science and take cognizance of moral and mental qualifications, in much the same way that private clubs and societies guard their standards of membership. There is many a man known as "not clubable" who yet could pass examinations in science with flying colors. If the public is to be urged to license architects—and we feel very strongly that it ought not to be so urged—then we are quite certain that, in addition to the scientific, there should also be held a moral and commercial inquest. Now, as it is obviously even more impossible to make a sane and sound finding as to a man's status in these respects than it is to determine his real capacity as an artist, it is easy to see that the real value to the public of a license issued to an architect after examination as to his possession of but one out of four sets of essential qualifications is but twenty-five per cent. of what the promoters of the license method proclaim it to have.

AS the reader may not share our convictions on this license matter—and they are strong ones—we suggest that he should turn to another page of this issue and consider the opinions there set down by the editors of the English architectural journals as to the wisdom of the step taken early this month by the Royal Institute of British Architects looking to the registration of architects, as the licensing is there called. Although these editorial views do not actually coincide, and though one writer lays stress upon this objection and another upon that, it is plain that these men, who are trained in reasoning from cause to effect and do their thinking logically and with more care than the ordinary practitioner, since their conclusions must be set forth in type each week, look with disapproval and grave apprehension on the new movement.

IF there must be license laws, it is refreshing to have them honestly advocated and their real purposes declared in such a way that the public cannot misapprehend their purpose. This was done in the case of the proposed supplementary law in California, to which we referred a few weeks ago, and the same sort of praiseworthy ingenuousness seems to be employed by the architects of Texas, who have organized for the purpose of securing the passage of a license law, and have frankly declared that one of their objects is to prevent builders and contractors from erecting buildings in the State after drawings prepared by themselves. Here the issue is honestly presented, and the architects have been so unwise as to lock horns with the very men with whom the most harmonious of relations should be maintained. The natural result has been that the builders, too, have "organized." and by that fact have made the passage of the desired law almost an impossibility. Now, taking the latest accessible figures, and disregarding partnerships, we find on comparing Texas with Massachusetts, States which have approximately equal populations, though the former has more than thirty times the area of the latter, we find that, while Massachusetts has one architect for each 22 square miles of territory and 7,461 of population, Texas has but one architect for every 2,657 square miles of territory and 30,487 of population. The Southwest is growing very fast, and Texas, big as it is, is filling up with the rest of the country, and it seems to be the height of absurdity for anyone to imagine that the vast amount of building that must be done in a rapidly growing State is, by its Legislature, going to be placed at the mercy of a small trade union of architects.

AT the other end of the country a bill has just been introduced in the New Jersey Legislature which seeks to do away with the payment of the annual fee that was established by the license law passed in 1902. If this bill passes, our present great respect for "Jersey justice" will be moved up another notch. About the same time, the Grand Jury of Middlesex County, Massachusetts, influenced by Judge Kingsbury's report on the coroner's inquest into the collapse, last July, of the Amsden Building in Framingham, by which twelve persons lost their lives, recommends "the passage of a law requiring architects to pass examinations as to their qualifications before being admitted to the practice of their profession." Now, here is something that is worthy of attention. It is a real, perhaps a unique, request proceeding from the public itself, and urged for its own protection, and so not at all in the same class with the California and Texas movements. But, though worthy of attention, and all the more that it does not suggest that particularly obnoxious element, the payment of an annual license fee, it is hardly more reasonable than the others, since it starts from an inadequate premise. It is true that the Framingham accident was a serious and seemingly an easily preventable disaster, but it is not clearly established that the architect's responsibility for it was a major one, nor is it certain that he might not have been able to pass a licensing examination. The architects of Massachusetts are human and, so, liable to blunder now and then, but such blundering cannot be prevented by an examination, and the standard of practice is there so high that the really unqualified man is not tempted to remain in a field where he has to compete with so many who are his betters. As to the real value to the public of any license law, it must be remembered, among other things, that in one of the worst building accidents that have occurred in this country in recent years, the collapse of the Hotel Darlington steel frame in New York, the question of the responsibility of the architects was hardly raised, the collapse having been caused by the folly of the owner and the ignorance of the builder's foreman.

MARBLE AND SCAGLIOLA.

IT is one of the canons of heraldry that a base metal shall not be charged upon a precious metal. It is a pity that a similar canon does not rule in architecture, that would prevent the use of an imitation in close connection with a genuine material of great cost and beauty. At the first glance it might seem, especially to a layman, as if such a practice were confined wholly to cheap and pretentious buildings, and so deserved but little attention. But when glaring instances are found in some of the most noteworthy and elaborate edifices in the country, in structures that have cost millions of dollars each, one may be permitted to raise a voice in protest. The reference, of course, is to the employment of rare foreign marbles, and their close imitation in scagliola, which is placed in juxtaposition.

I must be permitted, at the outset, to explain that I have no word to say against the use of scagliola in what I conceive to be its proper place. That it pretends to be nothing but an imitation is no legitimate ground for objection to it. Many of the highest forms of decorative art are wholly imitative, and are none the worse for it. Fresco painting is constantly enhanced by imitative work. When Michael Angelo wrought his stupendous "Last Judgment" on the ceiling of the Sistine Chapel he was compelled, in order to render the plain, coved vaulting suitable for his purpose, to simulate architectural enrichments that had been omitted by the builder. It was the inspiration of his matchless genius that led him, first of all, to paint entablatures, pilasters, panels and pedestals before he created his human figures and landscapes. This is an example of imitative work of the highest order. To come to one of the lowest forms, and yet equally legitimate, mention may be made of graining. This is a style of decoration that has very largely passed away, and there are few master craftsmen left. The present generation can scarcely judge of the possibilities of graining, unless a study is made of old houses. I have in my mind a stately old residence in Albany, the dining-room of which was made notable by splendidly grained panels, representing knotty burls of butternut wood. It is the fashion to sneer at graining, and yet why should it not be just as permissible for craftsmen to copy in paints the beautiful coloring and marking of wood as for the scagliolist to imitate marble? When graining was in the height of favor no one thought of framing a grained panel within borders of wood in natural finish, nor was the trim in a room ever divided between grained and natural varnished wood. And yet there seems to be not the slightest hesitation in combining marble and scagliola imitation, with no strongly marked line of division. If they can be run together so as to deceive the casual or untutored glance, the better the job.

As a general proposition, if we grant the right to treat surfaces of plaster with pigments in an imitative way we cannot object to the copying of marble. No one would think of imitating marble on a wooden surface or wood on a plaster surface, because of the difference in texture. But the smooth, hard finish of plaster, aided by careful treatment with shellac and the rubbing stone, naturally lends itself to a reproduction of the effects of polished marble. It is a direct copy of nature, and it is undeniably pleasing to the eye. Therefore it must have its place in the scheme of decoration. If we grant that scagliola, in itself, is an eminently proper form of decorative art, and if we admit that a good workman can so closely copy his model that it is almost impossible to distinguish between the two, on what grounds shall one object to the employment of the genuine and the imitation in close association?

In the first place, there is the ethical view of the matter. As I have argued above, a frank imitation can be justified by the entire history of decorative art. But when the imitation is designed solely to deceive and to cover up the substitution of a cheap for a costly material, the question of architectural morality must be taken into account. Scagliola, as scagliola, is beautiful and useful, but scagliola as marble can never be anything but a fraud. If I put this strongly, I recognize that ethics in a matter of this kind is very largely a question of individual point of view. Therefore I wish to urge my objections on the broad grounds of expediency.

When a great building is planned, nothing is more important than the interior scheme of decoration. In many office structures this is often of far greater moment than the design of the exterior. There may be a single narrow façade, of towering height, and of enforced simplicity because of the surroundings. Yet within may be lavished all the art of the stone-cutter, the metal-worker and the decorator. The marts of the entire world are drawn upon for material. The quarries of Italy, Spain, France Greece or Algeria yield up their choicest treasures. If a rare and beautiful marble is chosen for the interior decoration, at a cost of from $10 to $15 a cube foot, should not the most be made of it? Should there be anything to distract the attention from its beauties? But the question of cost comes in just here. The choice has been made of the most exquisite material offered, but to carry out the entire work in this marble would exceed the available funds. Or else there is a call for columns and pilasters too massive to be had in this particular stone. It would be a shame to turn to a more commonplace and cheaper material! Then comes the insidious suggestion to use scagliola in connection with the marble, so that the desired effect may be attained. The marble man, anxious to sell his high-priced stone, is one of the first to suggest that the columns which he cannot supply be imitated in plaster. It seems a simple and satisfactory solution, and the work is carried out, partly in the real stone and partly in a wonderfully close simulation in plaster.

What is the result of this combination of the real and the imitation? I do not mean when years have gone by and the weaker material has begun to show the signs of dilapidation, but when it is brand new. As a general proposition, the more beautiful a colored marble is the less sound it is. There are some exceptions, for Siena is recognized as one of the most beautiful and popular of the foreign marbles, and this is a reasonably sound stone, particularly the variety known as "Siena Unie." But what is generally desired is bold pattern and rich and variegated color. This combination is mostly found in a strongly brecciated marble. A breccia has been broken up at some period of its history by a great convulsion of nature, and then has been cemented together again by percolating water holding minerals in solution. It is bound to be more unsound than a marble of saccarhoidal texture. Some of the most exquisite marbles in existence are so shattered that they would fall to pieces if worked in slabs unless backed up with a cheap stone. When polished there are cracks and pits that have to be filled with wax and shellac. We pardon the imperfections in view of the beauty of the coloring. Imagine a stone of this kind laid up in a wainscot or turned into columns and adorning a magnificent interior. The eye sees dull spots in the gloss of the finish; the hand feels rough places. Without anything to distract attention, we would think of these merely as the "flies in the amber." We would be grateful to Nature for giving us marvelous harmonies in color, like the massing of gems. But just beyond may be a huge column, too large to be made of the genuine stone, and therefore copied in scagliola. The colors and the pattern are all there and the imitation is of marvelous fidelity. The trowel has left no cracks and the shellac and the rubbing stone give an unbroken sheen. A close examination will show that there is not the exquisite translucence of the marble, but this is not missed in the casual glance. Nine out of ten beholders will lavish their admiration on the imitation and deplore the fact that the rest of the work is less perfect. Does this seem an extreme statement? Then watch the crowds that flock into the great commercial buildings where such work is to be found.

But why object to imitation that is as perfect as this, imitation that surpasses the original in some respects, it may be asked, The answer is simple and should be convincing, I think. Why, at the very outset, discredit the rarest and most costly feature of the entire scheme of decoration? Nature has kindly given us a marvelous material. Why make manifest its few defects? Concrete illustrations are always better than abstract arguments. I could multiply them without number, but a few will suffice.

In lower New York there is a banking office finished in one of the rarest and most exquisite marbles ever quarried, "Royal Irish Connemara." This is such a combination of wonderful greens as one would expect to find nowhere else but in the Emerald Isle. Every tint is shown, apple, sea, olive, nile, grass and moss greens, and deep, cool serpentines that have almost the sparkle of the emerald itself. These are mingled with splashes of white, yellow, dove and lavender, in bold effects. Being brecciated, it does not yield a surface like the ordinary Italian white marble. To expect it would be like demanding that the diamond come in masses like rock-crystal. In the center of the room, supporting the dome, are immense columns of scagliola. They reproduce the color and pattern of the Irish marble marvelously well, and the surface and gloss are flawless. The average visitor thinks

them wonderful shafts of stone and then sniffs at every defect in the matchless marble itself.

In one of the largest of the modern office buildings is a two-story vestibule. This is wainscoted with exquisite Siena marble, so wisely selected and deftly matched that it is a delight to the connoisseur. Two immense columns support the ceiling. These are altogether too large to be produced in marble, so they were given over to the scagliolist. They are the first things to confront the eye, and the ordinary visitor passes his hand over the glassy surface and wonders at their perfection. The wainscoting, costing thousands upon thousands of dollars, is absolutely unheeded by nine out of ten, and the walls might almost as well have been in plaster, painted in distemper.

But one of the most deplorable uses of scagliola is in a municipal building recently completed and not far from New York. The most striking feature of this structure is a central rotunda the full height of the building, and crowned with a dome. In this rotunda is the grand stairway of white Italian marble, richly carved, sweeping up in a graceful curve from either side to a balcony. Archways, running up three stories, break the walls of the rotunda at the four sides of the building. On the first floor are many magnificent columns and pilasters of "Brecche Starzema." This is one of the most exquisite of all the brecciated Italian marbles. The ground mass is white, often in large blocks, with bold markings in brown and purple. There are occasional broad splashes of red and chocolate color. These pillars are about twelve feet in height, perhaps the extreme limit of size for a stone of this nature. Above are many columns and pilasters of twice the size, running from the floor of the second to the ceiling of the third story. Of course these are in scagliola, and they quite dwarf the genuine stone. Fortunately they bear the sign manual of imitation and will deceive no one except at a distance. The rotunda is wainscoted in white Italian marble carried to the height of the first story. This has an elaborate cornice of scagliola, simulating medium blue marble, very much better executed than the columns. The cornice goes entirely around the rotunda, springing across the archways. Above the scagliola is a low wainscoting of genuine marble again, while the span of the archway is filled with a marble balustrade resting on the plaster cornice. Above the marble is scagliola once more. Thus we see the imitation actually crowding in between two genuine features of the decoration.

This concession to economy and expediency has brought its own punishment already. In less than two weeks after the completion of the building and the turning of it over to the municipality, cracks developed in the big columns. How far these defects will extend it is too early to say as yet. An equally serious disturbance is noted in the lighter colored scagliola that forms the main wall of the rotunda. The pigment was evidently applied before the plaster had sufficiently dried, or the latter contained some staining ingredient, for unsightly blotches are appearing. All of these defects are doubtless due to local conditions and have no bearing on scagliola in general. They only serve to point to difficulties that may possibly confront any architect who is led to employ an imitative substitute.

Scagliola is a comparatively new process. Of its durability we have no record as yet, and the question of repair and replacement has not arisen. That it will not have the life of the genuine marble goes without the saying. What will be done when it cracks, scales, chips and falls into general dilapidation? Are we then to scrape it off, patch it up, give it a new treatment of pigment, and then shellac and rub it down until it is as good as new? By that time the genuine marble will have lost its pristine freshness and will be more grievously eclipsed than ever by the smart imitation. Perhaps we shall be ready then to turn the marble over to the painter and stainer.

If objection is urged to the employment of marble and scagliola in conjunction, there should be a consideration of conditions leading to its employment, and a suggestion as to remedy. When the architect plans the interior of a building he settles upon the general scheme of the decoration and then proceeds to work out the details. It is not to be expected that when he draws each separate feature he shall run around to the marble-yard, tape line in hand, to learn whether this can be carried out in the rare marbles. But there are considerations always ruling in the marble trade that should never be lost sight of. One of these is that it is virtually impossible to get extra-large blocks of the finest stone. In the first place, the deposit itself is not likely to yield sound stone. In the second place, the material generally is found in a foreign country, where quarrying and hoisting appliances are of the crudest. In the third place, the deposit is usually far from regular lines of transportation and the stone has to be carried long distances by ox teams. For all of these reasons foreign quarries rarely care to deliver blocks exceeding a maximum dimension of ten or twelve feet.

Another important point is that the price of marble increases by arithmetical progression with the size. A block of fifty cubic feet might be $4 a foot, one of 100 cubic feet $6 a foot, while a block of 150 cubic feet might cost no less than $8 a foot. In other words, a column 2½x10 feet might cost in the rough only $260, while one 3x12 feet would be $650 and one 3½x15 feet no less than $1,500. These would be extremely moderate figures for many of the commoner varieties of marble. It will be seen how decorative features of this order will eat into a building appropriation and with what restraint they should be introduced.

When the plans for a building are all completed and estimates are asked for, then comes the tug of war. The marble man will show his rarest and choicest samples. His first figures on these may be overwhelming, but he is ready with an insidious suggestion. Part of the interior can go into the exquisite marble, and if the rest is put into scagliola only the initiated will be any the wiser. And the job is carried out on these lines in too many cases. If the foreign marble is too expensive for the entire work, why not put it all in an American stone? We have beautiful native marbles, perfectly suited for interior decoration, and certainly superior to any combination of real and imitation quarry products. Or if a column is too large for a monolith, why not have it in three or more parts? If greater strength is desired, the columns could be core drilled at little cost and a steel shaft inserted in the center to bear the burden.

If it is found impossible to avoid a combination of marble and plaster, we ought to be ingenious enough to devise some treatment of the latter that will not be open to the objections urged. Surely there must be decorative treatment that is æsthetically satisfying and yet violates no canon. Let the plaster be frankly plaster and it will have the usage of the greatest masters of all ages to commend it. Let it be finished by the scagliola method if desired, for this is excellent in itself. But put a better, because more suitable, pattern before the craftsman to copy than the surrounding marble.

A finish that seems particularly effective in plaster is old ivory. This would harmonize with any material used in conjunction with it. Relief work could be picked out in darker tints, to emphasize the shadows. The effect would be that of antique marble, such as one sees in the better class of plaster statuary. Such a treatment as this would permit of a free use of plaster, where size makes it impossible to employ marble, or where location renders it needless, without in any way discrediting rare and costly stone in the same interior.

If scagliola in imitation of marble be barred from use in direct connection with the genuine stone that it copies, there are still many places for which it is admirably adapted. In one of the largest of the Catholic churches of New York scagliola has been very freely employed. The wainscotings surrounding the various altars and shrines copy the beautiful marbles of France and Italy. The rails in front are, of course, of the genuine stone, but these are not brought into direct contrast with the imitation. In the "dim religious light" of the church interior the too-perfect brilliance of the scagliola is not apparent and it gives the beautiful color effects and irregular patterns so much to be desired. Most of our church walls are treated in distemper, and are often cold and forbidding. Marble is out of the question for such use because of its cost. In replacing distemper or hideous stencil work on the walls of churches and public halls, scagliola would find its truest province. FRANCIS WOODWORTH HOYT.

THE LICENSE [REGISTRATION] QUESTION IN ENGLAND.

THE following report of the Council, the Royal Institute of British Architects, on registration was adopted at a meeting held March 4 last:

Section I.—The Council have had under their consideration the report and recommendations of the registration committee adopted in principle at the general meeting held April 3, 1906, and have the honor to report as follows:—

Section II.—The following principles were laid down in that report and agreed to:—

a. That the Institute should endeavor to obtain Parliamentary recognition of its membership.

b. That it be made compulsory after, say, 1912, that all archi-

tects, before receiving the diploma of membership of the Institute, must have passed through a definite course of architectural education.

c. That a temporary class of licentiates of the R.I.B.A. should be established.

d. That in future Fellows be elected: from the class of Associates; by the Council in special cases.

e. That disciplinary powers of the Institute should be increased, with power of appeal.

Section III.—The proposal that the name of the Institute should be changed to the Royal College of Architects was not favorably received by the majority.

Section IV.—In the application to Parliament for an act the following were suggested as the essential points to be urged and objects to be attained:—

f. To declare that it is in the public interest to enable the public to distinguish architects recognized as qualified by a competent authority from those not so recognized.

g. To extend the present chartered privileges of the R.I.B.A., making it the statutory authority for the education and examination of architects for admission to the Institute.

h. To legalize a scale of charges.

Section V.—The Council have given careful consideration to all the principles above enumerated, and recommend that as a first step a revised or supplemental charter should be applied for, embodying as many of the principles set forth in Section II. as possible, and that when this has been done an Act of Parliament should be applied for as soon as practicable. They now proceed to deal with each principle in detail.

Principle A.—Parliamentary Recognition of Membership of R.I.B.A.

This is explained by Section IV. above.

Principle B.—Compulsory Architectural Training.

1. Your committee recommend that effect shall be given to this principle by altering the charter and by-laws so as to make this training a condition precedent to entering for the final examination qualifying for membership of the Institute, and legalize machinery for dealing with the subject from time to time, so as to get the advantage of experience.

Principle C.—Licentiates.

2. It is intended that the period of entry into this class shall close twelve months after the date of the revised or supplemental charter; after that date no person shall be admitted a licentiate, and on the resignation or death of the last surviving licentiate, the class shall cease to exist. This new temporary class of licentiates shall be a non-corporate one, *i.e.,* a class having no corporate rights in the property of the Institute, no authority to control its management, and paying a subscription for a specific consideration; that is to say, they shall have the use of the Institute premises, the receipt of the Institute publications, the privilege of using the initials L.R.I.B.A. and the privilege of being present at all meetings of the Institute, except business meetings, and taking part in the discussions on papers read.

3. Licentiates shall be persons elected by the Council within twelve months of the date of the revised or supplemental charter who have attained the age of thirty years, and who at the date of their application for admission shall have been—(*a*) for at least five successive years engaged as principals in the practice of architecture; or (*b*) for not less than ten years engaged in the study or practice of architecture to the satisfaction of the Council.

4. The Council are also of opinion that a special examination might be established for licentiates, enabling them to enter the Fellowship class should they become in due course eligible.

Principle D.—Election of Fellows.

5. This is governed by a resolution of the Institute, June 6, 1904, as follows:—"After December 31, 1906 (extended by resolution of the Royal Institute at the general meeting of December 4, 1906, to December 31, 1907), every person desiring to be admitted a Fellow shall be required to have passed the examination or examinations qualifying him as an Associate, or shall be elected from the ranks of the Associates. But in special cases the Council,[1] by votes of three-fourths of such members of the Council as are present and voting at a meeting of the Council, shall have power to dispense with such examination or examinations."

6. The Fellowship is thus generally to be open only to Associates or those who have qualified for admission as Associates, but the Council recommend that it shall be also open to licentiates under certain conditions. (See paragraph 4 of Principle C, Section V. of this report.)

Principle E.—Disciplinary Powers.

7. The Council propose to increase the disciplinary powers of the Institute by obtaining authority to publish in the public press the fact of the expulsion of a member of any class.

Section VI.—With regard to Section III. above, the Council do not recommend that the name "The Royal Institute of British Architects" should be changed.

Section VII.—Although such considerations are for the present outside the scope of the reference to the Council, they yet venture to suggest that the alteration of the charter and by-laws in accordance with the above recommendations might be a convenient opportunity for making other alterations, such as:—

8. The modification of the by-law regulating the formal presentation of members at a general meeting.

9. The reorganization of the machinery for filling the office of president or honorary secretary in the event of a vacancy arising from death or resignation during any session.

10. The abolition of the power given to the Council to elect direct to the Fellowship the president or president-elect of an allied society.

11. The consideration of the representation of the allied societies on the Council.

[From *The Building News* for March 8.]

THERE is little wonder that the Report of the Council of the Institute with regard to registration, presented at the meeting last Monday evening, was carried, in spite of its one-sided and, in some respects, highly objectionable nature. It was issued as a "private and confidential" document, so as to reach the members only on the previous Friday morning, giving them little time in which to digest its provisions, and practically insuring that members in the provinces should be unrepresented at the meeting. Now, it is the provincial men who are most affected; yet it is difficult for those non-resident in London to make long journeys at short notice, and it is consequently always possible for a London Council, by adopting a certain course of action, to secure a vote.

Broadly speaking, the report goes no farther than to restate and more definitely affirm in detail the principles which were generally approved, and some which were distinctly disapproved, when the original report came up for consideration on April 3, 1906. This was the outcome of a so-called compromise between the Registrationists and their opponents—a compromise which is now seen to have been of an entirely one-sided nature. The desire of the Registrationists is to secure that *all* architects shall in the future be properly trained before being permitted to practice. The compromise to which effect is now sought to be given goes no farther than to insist that all members *of the Institute* shall be hall-marked as efficient. In other words, it is sought to establish, by means of the elaborate machinery of a new charter and an act of Parliament, exactly the state of affairs which exists at the present time, with the addition of one or two highly objectionable features. The first of these is the formation of a new temporary class of licentiates, who are to be persons elected by the Council—*not by the members*—within twelve months of the date of the new charter, and who shall have been either for five years engaged as principals, or for not less than ten years in all, in the study or practice of architecture. They are to have no corporate rights, and no voting power, but merely the privilege of calling themselves L.R.I.B.A., and of attending the Institute meetings, with the exception of the business meetings—and one other. The licentiates, together with the Fellows and Associates, are to have laid down for them a legalized scale of charges. What this scale is likely to be we know tolerably well. It is a very attractive thing to the lazy man of all callings to have a certain rate of wage which may not, under any circumstances, be lowered. It is the very attractiveness of this that the Institute's present Council apparently depends upon for securing a large adhesion to the new licentiates' class; but it is just as well to look at the matter for a few moments, and see how it will work out. The great probability is that Parliament would refuse any profession a legalized minimum scale at all. The only profession which at present has a scale of fees is that of the law, and solicitors well know that it was forced upon them in order to prevent them from over-charging. Parliament is almost certain to take the same view again, and to

[1]The Council recommends that at least sixteen members of the Council should be present.

safeguard the interests of the public against architects, and not those of the architects as against the public. In whatever form the proposal is put forward, it is morally certain to be altered when it comes before a body of solid business men in such a way that charges will be laid down which may not be exceeded. This is hardly what the promoters expect, and would certainly do harm. It would reduce architects to the unenviable position, which solicitors now occupy, of having to submit to a taxing master, being perfectly at liberty to accept less than the scale rates, but never allowed to charge more.

Even if a minimum scale, such as that at present in force, were legalized with regard to Institute members, the general position would not be much improved. The Institute would be converted at one stroke into a huge trade-union, the members of which, capable or incapable, energetic or slothful, would charge the same minimum percentage on executed work and the same minimum sum per diem, whether work were done for it or not. Outside the Institute there would still remain the larger number of architects, many of whom, as was admitted in the discussion on Monday night, would be men of considerable standing. These would be free to charge whatever they liked. They would be the non-unionists. The practitioner of architecture would be in the same position as the modern mechanic. There would be the union men and the non-union men, and the non-union men would have the advantage of being able in their earlier days, when their services were of comparatively little worth, to accept such a fee as it would be just that they should be paid, without being forced to ask more than the value of their services. It may possibly be said that this great difference would exist—that in the mechanics' trade-union there is no test of competency, while such would be guaranteed by the Institute. But, on the other hand, the public would scarcely discriminate between a competency which would rest on the passing of the Institute examinations and upon another competency as proved by having passed the examination of the Society of Architects. They would say—and quite justly—that the one was as good as the other. What, too, about the licentiates—men of so low a standing that they are not eligible for Fellowship, are incapable of passing the moderate test required of Associates, and are not to be trusted with voting power, or the right of even attending business meetings? The plea of competency could scarcely be raised on their behalf as against the great bulk of non-unionists outside.

An effort was made last Monday night to obtain an alteration in the report which would at one stroke have converted a useless into a useful document, by making the Institute the examining body, not merely for admission into its own ranks, but into the profession of architecture. This was, however, foredoomed to failure, owing to the constitution of the meeting, as already explained.

What the Institute intends to do is visible upon the surface, and at first sight it is so nearly the right thing that it may well have deceived its own advocates. There is a certain fascination about the idea of converting the Institute into a trade-union, the members of which shall be able to claim a scale of fees which is distinctly in their own interests; but it is mere glitter, and not real gold. The Institute, in thus aiming at its own personal aggrandizement, and not at the advancement of architecture and architects as a whole, is dropping the meat which is in its mouth for the sake of the shadow in the water.

[From *The Builder* for March 9.]

We are glad to learn that at the meeting of the Institute on Monday the ill-advised clause which had appeared in the report of the Council on the resolutions with regard to the question of registration, recommending that the proposed bill should include a clause instructing municipal authorities to employ members of the Institute on their architectural works, was, on the advice of wiser counsellors, struck out. The idea that Parliament would ever give its sanction to such a proposal is really too absurd. We quite concur in the opinion that official surveyors or engineers ought not to be charged with the carrying out of important public works of architecture (or what ought to be such) by a municipality; but the only way to bring this about is by the gradual education of the public in architecture, which will eventually lead to a demand that important buildings should be carried out by the best architect who can be secured, and not by the municipal official. It is absurd to suppose that such a change can be wrought by any attempt at coercive measures.

We are not much more in sympathy with the attempt, which we do not think will be successful, to get Parliament to give legal recognition to any scale of architectural charges. It is altogether letting architecture too much down to the level of a mere profession. If architecture is an art, as in our better moments we seem all inclined to agree, it may be asked—who ever heard of any other body of artists wanting a "scale of charges?" An eminent painter, like an eminent barrister, gets what he can—what his reputation enables him to charge. An eminent architect, if he considers himself an artist, ought to be free to do the same; and one of less reputation ought not to be blamed if, like a painter whose reputation is not made, he accepts a lower fee than the eminent man; what he can get, in short, just as the painter does. The whole five per cent. system is a mistake, and is always leading to conclusions, on the part of the outside public, injurious to architects. We only wish the present opportunity could be taken to abolish it altogether, instead of attempting to get it permanently sanctioned by Act of Parliament.

[From *The British Architect* for March 8.]

What the effect of this development on the character and objects of the Institute may be, it is not possible to fully realize. We are more than doubtful whether the action which is being taken really represents the desires of the very best men in the profession; we do not mean the most successful men, but those to whom architecture is really a fine art. But the regulation of one's exact status by a public body, though it may qualify for the payment of a subscription, or the recovery of a fee, does not affect the inherent capacity which is developed by the individual, and we imagine there will always exist a body of outsiders whose ability is not to be measured by the regulations of a society.

That this revision of the Charter of the Royal Institute of British Architects is a matter of considerable importance to the profession is not to be doubted, and we imagine that the general result of it will be to give mediocrity a still better chance. We shall perhaps get a better educated class of architects, who will obtain a better status and a more definite legal position, with perhaps more responsibility, but the need for a class of men who are artists in building will perhaps be met by the evolution of a new profession. There would be a distinct gain to art if the comparatively small number of men who have the instinct for art in building could acquire a definite and specialized line of work which would be practically independent of quantities, building accounts, hot-water apparatus, drains, and expert evidence in the law courts. The educational facilities which are opening up on every hand should gradually evolve quite a large number of technical experts, who will be called architects, and who will be able to estimate accurately, and who should make business hum generally by the aid of a well-managed office full of clerks. These will provide all that is generally called for by the British public in the way of architecture, and at times the work they do will rise to the level of quite passable copyism. If a few real artists arise, to whom the protected formulas which will govern an architect's existence are prohibitive, they will be able to claim much larger fees than the ordinary five per cent., for they will perhaps live on the work, and direct the building, as it goes up stone by stone. They will not be tempted away from their legitimate art by the many good things which will fall to the lot of the qualified and protected expert, and so, by giving all their time and thought to the production of good design in the actual building, will be able to demand more from their clients. It is surely time that art in building was paid for in varying degrees, just as it is in the case of pictures, and it will be delightful for the true artist to get better payment for more pleasing duties. Should this state of things arise, as a side issue, it will prove to be one of the inestimable benefits of the new Charter of the Institute.

JURISDICTIONAL DISPUTES IN BUILDING TRADES UNIONS.[1]

THE frequency of quarrels over trade boundaries is a constant source of irritation to the officials of the American Federation of Labor, before whom they come up for adjudication. During 1903, for example, "the Electrical Workers and Machinists objected to a charter being granted to the Elevator Constructors. The Plumbers had disputes with the Metal Workers and the Electrical Workers over the question of conduit work, which was finally granted to the Electrical Workers. The Sheet Metal Workers contended with the Painters as to which

[1]Extracts from a report to the Bureau of Labor on "Conditions of Entrance to the Principal Trades," by Walter E. Weyl and A. M. Sakolski.

union should do the glazing in metallic skylights and sashes, and the United Brotherhood of Carpenters with the Wood, Wire and Metal Lathers over the jurisdiction of wood lathing."[2]

The origin and character of disputes of jurisdiction or demarcation is exemplified in the shipbuilding industry of Great Britain, concerning which Sidney and Beatrice Webb write as follows:

"The gradual transformation of the passenger-ship from the simple Deal lugger into an elaborate floating hotel has obscured all the old lines of division between trades. Sanitary work, for instance, has always been the special domain of the plumber, and when the sanitary appliances of ships became as elaborate as those of houses the plumber naturally followed his work. But, from the very beginning of steam navigation, all iron piping on board a steamship, whatever its purpose, had been fitted by the engineer. Hence the plumbers and fitters both complained that the 'bread was being taken out of their mouths' by their rivals.

"We need not recite the numberless other points at which the craftsmen working on a modern warship or Atlantic liner find each new improvement bringing different trades into sharp conflict. The Engineers have, on different occasions, quarreled on this score with the Boiler Makers, the Shipwrights, the Joiners, the Brass Workers, the Plumbers, and the Tin Plate Workers; the Boiler Makers have had their own differences with the Shipwrights, the Smiths, and the Chippers and Drillers; the Shipwrights have fought with the Calkers, the Boat and Barge Builders, the Mast and Block Makers, and the Joiners; the Joiners themselves have other quarrels with the Mill Sawyers, the Pattern Makers, the Cabinetmakers, the Upholsterers, and the French Polishers; whilst minor trades, such as the Hammermen, the Ship Painters, and the 'Red Leaders,' are at war all round."[3]

One of the most recent of the important jurisdictional disputes in the United States is that prevailing in the plumbing and steam fitting trades. Plumbing, steam fitting, gas fitting, sprinkler fitting, fixture hanging, and pipe cutting are now separate occupations, though originally all such work was done by the same workmen. With the progress of invention the trade has branched out into broader fields, and the journeymen have become specialists, each following a different line of work. Regarding this disintegration of the craft the president of the United Association of Journeymen Plumbers, Gas Fitters, etc., in his report to the thirteenth general convention, spoke as follows:

"Our trade as well as others has been rapidly branching out into unknown fields, so that to-day we have branching from plumbers, gas and steam fitters an array of specialists, such as sprinkler fitters, ammonia pipe fitters, fixture hangers, beer pumpmen, and "ship plumbers," all of which properly belong to and are, in a great majority of cases, graduates of the first-named branch of our trade. While not all of the last mentioned are affiliated with the United Association, they are using the same tools and fittings and should properly affiliate."[4]

The endeavor of the United Association of Journeymen Plumbers to control all branches of plumbing and steam fitting has led to a jurisdictional dispute with the National Association of Steam and Hot Water Fitters. The International Association of Journeymen Plumbers, Steam Fitters and Gas Fitters was first organized in 1880; went to pieces in 1888, but was reorganized in 1889 as the United Association of Journeymen Plumbers, Gas Fitters, Steam Fitters and Steam Fitters' Helpers of the United States and Canada. The year previous, 1888, the National Association of Steam and Hot Water Fitters and Helpers had been formed, which included men employed in the fitting of engine and boiler connections, and piping for power or heating purposes, for refrigerating, and for fire extinguishing. The journeymen doing this line of work had previously belonged to the plumbers' locals. Accordingly when separate national organizations were formed a jurisdictional dispute arose, the plumbers claiming that steam fitting was a branch of their trade. Ill feeling has existed between the two organizations ever since. In 1899 a charter was granted by the American Federation of Labor to the National Association of Steam and Hot Water Fitters, with the provision that steam fitters who were members of the United Association of Journeymen Plumbers might retain their membership in the latter organization if they preferred, and that steam fitters might join the plumbers' locals in towns where their number was too small to form a separate union. The United Association of Journeymen Plumbers entered a vigorous protest against the granting of this charter, and have since been seeking to have it annulled.

The jurisdictional disputes in the wood-working trades have grown out of the same conditions as that of the plumbing and steam-fitting trades. The Machine Woodworkers' International Union was formed in St. Louis, August 5, 1890. At that time both the United Brotherhood of Carpenters and Joiners and the International Furniture Workers' Union admitted machine woodworkers to membership, although neither organization made any special effort to organize this class of mechanics. In 1894 the United Brotherhood of Carpenters conceded to the Machine Woodworkers' International Union jurisdiction over all factory woodworkers, and drew up an agreement with the latter in which the jurisdiction of each organization was defined. In the following year the Machine Woodworkers amalgamated with the International Furniture Workers' Union, thus virtually abrogating the jurisdictional agreement with the carpenters. In October, 1897, a new agreement was made whereby the Machine Woodworkers were given full jurisdiction over all mill hands, except carpenters who might at times be engaged at mill work, and except millwrights and stair builders. The United Brotherhood of Carpenters was to have sole jurisdiction over outside carpentry work and the fitting up of offices and stores.[5] In 1898 the Carpenters in general convention abrogated all agreements made with other woodworking organizations, and ordered that no such agreements be made in the future and that no other woodworking organizations be recognized. Local and district councils of the United Brotherhood, however, were still permitted to make local agreements with other woodworking organizations by a vote of their members.[6]

The jurisdictional dispute continued until 1900, when representatives of the Amalgamated Woodworkers presented themselves at the general convention of the United Brotherhood of Carpenters and Joiners and tried to arrange an agreement with the latter regarding the limitations of their craft boundaries. The woodworkers claimed, besides all work in mills, the right to put up saloon, bank, and drug store fixtures manufactured in shops under their control. The carpenters refused to grant the claims of the woodworkers, at the same time asserting their jurisdiction over all carpenter work as specified in their constitution, "believing that the division of control by two organizations of one trade cannot be tolerated, particularly where the standard of wages of one is lower than that maintained by the other." The Brotherhood was instructed to carry out this recommendation in each locality "in such manner as their best judgment suggests."[7]

The present constitution of the United Brotherhood of Carpenters and Joiners provides for the admission to membership of journeymen carpenters and joiners, stair builders, ship builders, millwrights, planing-mill bench hands, cabinetmakers, and men running woodworking machinery. The jurisdiction of the Brotherhood is to extend over all engaged in these occupations, "whether working on the building in its erection or repairs, or employed in the preparation of material for the same." This broad claim, if conceded, would give the Brotherhood control over the members of the Amalgamated Woodworkers, whose field is embraced in the last three occupations named above.

Another instance of how the use of new materials and changes in building conditions may lead to disputes over trade jurisdiction is found in the Bricklayers' and Masons' International Union. This union is one of the best organized and most independent of the building trades organizations. In the past it has held itself aloof from the general movements and alliances with which most of the other unions are affiliated. Within the last decade, however, owing principally to the fact that other trades are encroaching upon the work of bricklayers and masons, a strong sentiment of joining the American Federation of Labor has grown up within the union. The necessity is felt of an alliance with an organization which wields some influence in settling jurisdictional disputes. The officers of the union believe that the policy of isolation is inadequate to the rapidly changing conditions of the trade. New materials and processes which formerly did not compete with the bricklayers' and stonemasons' crafts are now competing actively with them. This condition is bringing with it a train of disputes involving endless trouble. Moreover, specialization within

[2] "Studies in American Trade Unionism," edited by Hollander and Barnett, p. 314.
[3] "Industrial Democracy," new edition, 1902, p. 508.
[4] "Plumbers, Gas and Steam Fitters' Official Journal," October, 1902, p. 25.
[5] "The Carpenter," November, 1897, p. 7.
[6] Ibid, October, 1898, p. 1.
[7] "Report of the Industrial Commission," Vol. XVII, p. 130.

[illegible] as well as the [illegible] which were formerly in- [illegible] have at [illegible] with [illegible] Co. [illegible] and The [illegible].*

ILLUSTRATIONS

[illegible] IN THE HOUSE OF THE LATE STANFORD WHITE, ARCHITECT: GRAMERCY PARK, NEW YORK, N. Y.

EIGHT PLATES.

[illegible] are, one cannot but regret [illegible] of alien artists of any age, and [illegible] of Stanford White's own [illegible] of composition and design. It is to an architect's own house [illegible] looks to find embodied there the art [illegible] aspirations that have [illegible] during musings before his own hearthstone. But here there is no indication of what Stanford White the artist architect could do, though the rooms are filled with proofs of the manner in which Stanford White the collector sought and cherished the works of earlier kindred spirits. The photographs speak for themselves. To give any adequate idea of the contents of these rooms would require the space and the method of a museum catalogue or a sales list, and if anyone desires the facts that can be found in such publications he should secure a copy of the catalogue for the sale at which, next week, all these artistic remains of Renaissance life, so patiently garnered and so lovingly classified and arranged, are to be dispersed at auction, for the house in Gramercy Park has been bought by the Princeton Club and is to be remodeled as a club house. It is a pity that the club had not the funds to secure collection, as well as house, for then some future Poe, musing amongst them alone in the dusk, must surely have received and interpreted in prose or verse the romantic stories involving love or hate that seemingly must exhale from such settings as these, for in all likelihood there is a greater proportion of authentic material here garnered together than is usually to be found in collections gathered by Americans nowadays. It is a pity that the Club could not secure them and, besides, the interior aspect of the modern American club house is so new, so garish, so upholstery!

All of these views, as well as those in the sale catalogue, were made by our own photographic department, and are here reproduced with the permission of the American Art Association, who are to conduct the sale.

Additional Illustrations in the International Edition.

CHIMNEY PIECE IN STAIRCASE HALL: HOUSE OF THE LATE STANFORD WHITE, ARCHITECT, GRAMERCY PARK, NEW YORK, N. Y.

[Italian. Istrian stone.]

STUDIO DOORWAY IN THE SAME HOUSE.

[XVI. Century Spanish.]

NOTES AND CLIPPINGS

Old St. Paul's Cross. The late H. C. Richards, K.C., left £5,000 to the dean and chapter of St. Paul's for the restoration of the ancient Cross of St. Paul's, swept away by the Puritans at the revolution. He left in his will an alternative, to the effect that the money might be spent in raising a memorial of the cross as near as possible to the actual site (which is marked with an inscribed stone at the northeast corner of the cathedral), the memorial not necessarily to be in the form of the original cross. Round the Gothic cross, and against Old St. Paul's, were in olden times erected stands for the sovereign, who often attended the open air services, and for the nobility and gentry and the city magnates. The cross was one of the most celebrated landmarks in Old London, where it had stood since the thirteenth century, and probably from an earlier date. A print, published in 1811, shows this "ancient and curious object as it appeared on Sunday, March 26, 1620, at which time it was visited by King James I, his Queen, and Charles, Prince of Wales," and when the sermon was preached by Dr. John King, Bishop of London. Latimer, Ridley and Coverdale are some who have preached from the cross, a history of which, as has been said, would be a history of religion in England, so that great memories are stirred by the present proposal. Before the Reformation papal bulls were read from the cross, which was also the official place from which ? ? proclamations were made.—*Graphic.*

Water-color Painting.—There are three kinds of water-color —first, the water-color pure, by washes of transparent color, in which lights are obtained by getting down to the white paper again; next, the pure opaque system, in which all colors, instead of being made paler by dilution with water, are mixed with Chinese-white; thirdly, the combination of the two systems, in which a work is usually begun in transparent color and completed by the addition of opaque lights. The first resembles nothing but itself; the second has many of the qualities of fresco; the third sufficiently resembles one kind of modern oil-painting to be easily adopted by painters accustomed to that kind of work. Now an oil-painter has great difficulty in accustoming himself to transparent water-color. A system of washes bears so little resemblance to any method possible in oil that it is long before an oil-painter can feel at home in it. On the other hand, pure body-color has its own difficulties. It becomes lighter as it dries, in which it is exactly the reverse of oil, which darkens in drying; besides this, an oil-painter often finds it difficult to glaze over a material which, even when dry, is so easily disturbed as body-color. But a combination of opaque and transparent color avoids some of the difficulties of both, and the artist does first what may be most easily done in transparent color, adding afterwards in opaque the details for which opaque color offers its own facilities. The habitual English method of oil-painting is to paint thinly at first, often in glazing color, and then touch the lights sharply and decisively in opaque, sometimes heavily loading, but rarely using thick color everywhere, as many Frenchmen do.—*The Architect.*

The Trade Unions and the Rebuilding of San Francisco.—The whole story of the looting and throttling of San Francisco in her distress, when all San Franciscans should have united to rebuild and restore the city, is the most disgraceful in the annals of American municipalities. Workingmen, public-service corporations, city officials and political leaders behaved like ghouls. The labor unions were not one whit behind the labor bosses and the greedy corporations, but, taking advantage of the enormous demand for labor to rebuild the city, they insisted on extortionate wages and made absurd and selfish restrictions upon the methods of rebuilding that enormously increase its cost and delay its completion. They are grafting in their own way, like their loftier exemplars. Concrete, which the earthquake showed to be the most desirable material for the construction of buildings in danger of shocks, can be used only if spooned into place with a trowel! There is not enough labor graft in concrete used by the bucketful. Building material has to be finished by men employed at the wages prevailing in San Francisco; in other words, it may not be finished at the mill and in the quarry, where, of course, only the ordinary wages prevail, but must be brought unfinished to San Francisco and there finished. These are typical instances of the labor graft. All classes alike seem to have thought of nothing but to get rich out of the city's misfortune.—*New York Tribune.*

Easement of Light.—An important article entitled "Notes on the Easement of Light in England and Elsewhere" has been contributed by Mr. H. A. de Colyar, K.C., to the *Journal of the Society of Comparative Legislation*, published by John Murray. In the course of it the practice of ancient Roman as well as of modern courts in most parts of the world is described. The labor required for the compilation of its few pages must have been onerous, and several hundred cases are referred to. Amongst other things it is pointed out that "in the United States of America the easement of light which obtains in England is not generally recognized, being regarded as an anomaly in the law. It could not, it has been stated, be adopted in the growing cities and villages of the great Republic without working the most mischievous consequences. The enormous height of American buildings, which has caused them to be nicknamed 'sky-scrapers,' is evidently one consequence of there being no easement of light to check their upward growth. It is believed that not any of the States comprised by the United States of America have adopted the English easement of light. At all events, it does not prevail in the States of New York, Massachusetts, Maine, Connecticut, Pennsylvania, South Carolina, Alabama and Maryland, though its retention in Illinois, New Jersey and Louisiana has been asserted."

*"Studies in American Trade Unionism," edited by Hollander and Barnett, p. 313. See also "The Bricklayer and Mason," February, 1906.

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SOCIETIES, PERSONAL MENTION, ETC.

THE reports published last week in all the Metropolitan newspapers that the Soldiers' and Sailors' Monument on Riverside Drive was "disintegrating" and "falling to pieces" had a very familiar air, for it was only two or three years ago that precisely the same sort of romancing was indulged in over the alleged parlous condition of the Grant Monument. These earlier forebodings proved to be but the overture to a series of suggestions, recommendations and hortations, all directed to one and the same end: the only way to preserve the Grant Monument from speedy dissolution was said to be to have its granite walls and roof treated with a certain waterproofing compound, the patents for which were owned by a certain worthy and doubtless intensely patriotic waterproofing company. We do not recall that anything was actually done to the Grant Monument to stay its promised disintegration, although it was proposed to increase the power of the heating apparatus, which would at the same time add to the comfort of the caretaker and prevent in the early springtime the condensation of moisture on the inner walls and vaulting, evidencing there the same sort of "sweating" which, on the warm days of last week, struck horror to the enfeebled understanding of the G. A. R. veterans, and sent them hurrying to the mayor with a prayer that he should prevent the imminent disintegration of their white marble idol, even if it must be at the cost of a contract with a waterproofing concern.

SEEMINGLY, the American participants in the late Peace Palace competition have been taking counsel together as to whether it might not be worth while to take some sort of action that should signify, to those responsible, their feeling of strong disapprobation with the manner in which the jury discharged its functions. Possibly, too, there may have been some of these competitors who favored copying the extreme action taken by the Dutch participants, who at one time threatened to take legal proceedings, for misfeasance, perhaps, against everybody concerned, and even now may enjoin the Carnegie Foundation Committee from expending any of its fund in carrying out the selected design. As this committee last week formally instructed M. Cordonnier to proceed with the work after his amended, and doubtless much simplified, design, we hope it will satisfy the Americans that there is no chance that the competition will be reopened, and persuade the Dutchmen that there is nothing to be gained now by keeping the unpleasant matter in ebullition. The New York *Evening Post* makes itself authority for the statement that the award was given—by a bare majority, as the official report declared—to M. Cordonnier by the suffrages of the Teutonic members of the jury, the British, French and American members being in opposition. We are glad to know this, for though we, like other people on this side of the water, knew that the attitude of the American juryman must be "correct," and though that of the British member had been disclosed in the English professional journals, we had acquired the belief that in this instance M. Nénot had been false to his training and reputation, and yet, now that we reflect, we had no better ground for the belief than the knowledge that he had drafted the jury's report.

TO make a reputation for oneself at the expense of others has through the ages been held as a sign of peculiar astuteness, and Archbishop Trench, doubtless, could have quoted saw, adage and proverb in all kinds of languages that would show how this peculiar form of mother-wit has everywhere been held in honor. But no one has been quite so successful in making people pay, if they will dance, as Andrew Carnegie and those thrifty American philanthropists who pattern after him. To predicate a benefaction on the condition that some one else shall within a short time double or treble it, else the promised benefaction lapses is, to say the least, pawky, although it does help to inflate a private source of beneficence to the last degree. We hear much of the bounty of one party to such transactions, but nothing at all of the other. When, however, we find an American Com-

monwealth adopting the same method and making its appropriations payable only on the condition that equal or greater sums shall be contributed to the same ends by private citizens, we come upon a phenomenon of economics that offends the ethical perception. If this course has been recommended by the State Board of Public Charities of the wealthy State of Pennsylvania because all its available funds have been squandered in furnishing the new Capitol, the new method, unpleasant as it is, would yet be explicable; but what a light it throws on ex-Governor Pennypacker's argument that the State had so overflowing a treasure-chest that there was no reason why it might not spend thirty millions in furnishing that building, if those in power but chose to think so.

IT would seem to most people to be a very simple thing for the State of Pennsylvania to convict the members of the Public Buildings and Grounds Commission and their architect of misfeasance in office, and so recover, so far as their private means will allow, some portion of the public funds they have wasted, and we feel quite sure that a suit for breach of contract could successfully be maintained against the State and each member of this Commission conjointly by each and every one of the many contractors who, in conformity with published invitations, submitted bids for one portion or another of the furnishings, only to have them thrown out because Governor Pennypacker had caused a vote to be passed that only bids covering every item in the schedule should be considered. As Sanderson was the only party who was advised of this secret vote, and as the schedule was both voluminous and multitudinous in its variety, the result was, as was expected, that he alone covered every item in the schedule, and under the vote his bid alone could be considered. A clearer case of collusion could hardly be brought before a jury.

IT will be very singular if, before long, some of the persons toward whom suspicion is directed do not "squeal," for there is a general belief that Sanderson did not keep all that came to him as profit. Representative Thomas, of Bucks County, in his newspaper, the Bristol *Gazette,* advances the interesting theory that the "furnishing" accounts are actually faked statements. He argues, and those who know him believe he has more or less supporting proof, that there was a serious deficit in the State Treasury owing to the manipulation of Senator Quay and his machine, and that this must have come to light as soon as the newly elected Democratic Treasurer assumed office. As the money was gone, and could not be replaced, the best way to account for its disappearance was to make it appear that it had been expended in furnishing the new Capitol, and the accounts were accordingly cooked up. The suggestion, though ingenious, can hardly be considered *ben trovato,* as there is too great a mass of interlocking and complicated evidence that shows that the whole unsavory affair is merely a gigantic piece of graft.

IT is quite useless, in view of these Pennsylvania revelations, for architects to feel indignation when anyone alleges that architects can be "fixed" or "got at" by a contractor or material-man, for the incident gives ground for a colorable belief that they can be. Still, to most of us, it is very disagreeable to be confronted with the belief on the part of the public that illicit commissions are commonly offered to, and as commonly accepted by architects, and, hence, the advent of the so-dubbed "anti-tipping" laws, wherever they have been introduced, has been welcomed by architects generally. The latest State to attempt to adopt such a law is Iowa, and the A. I. A. Chapter of that State has officially commended the efforts that Representative Hambleton is making to secure its enactment.

THE March *Bulletin* of the Forest Service of the United States Department of Agriculture starts off with a misstatement or, at least, a misleading statement, when it declares that the "annual yield" of the forests in this country reaches huge proportions, and then supports the statement with statistics. A business man who consumed each year not only the interest, but a considerable portion of his capital, would never think of asserting that he was consuming only the "annual yield" of his business, and he would find very shortly that he had left neither capital nor yield, and that is very much the way with the lumber situation in this country. The statement that the value of the forest product for one year is, at the point of production, $1,020,000,000 has, in connection with it, one piece of information that is sweetly consoling: the crop of maple sugar and syrup is worth $2,500,000, while turpentine and resin have a value of $20,000,000, and these two items are the only ones in the entire list that legitimately can be classified as "annual yield." The forestry question is pressing for solution and should have immediate attention, not only for the sake of the building interests, but for the even greater interests of the agriculturist. The Forest Service *Bulletin* is always interesting in many ways, and this issue shows, diagrammatically, how, since 1850, the eight States producing the most lumber have shifted and changed positions. The eight States in 1850 were (to save space we will use the familiar abbreviations), N. Y., Pa., Me., Ohio, Ind., Mich., Mass., and Ill. Of these only Mich. and Pa. are to be found amongst the eight leaders for 1905. Me., known emphatically as a lumber-producer, dropped from the list between 1880 and 1890, and N. Y. followed in the next decade. The most instructive career is that of Mich., which, in 1850, stood sixth in the list, and from 1870 to 1890 stood at the head, holding leadership longer than any other, but now ranks sixth, and, though the State has a more intelligent forestry-service than any other, is hardly likely to find a place in the list hereafter—the saw-mill has done its devastating work and moved on to other scenes. The same story is being repeated in Washington, which now heads the list, where it found a place only as late as 1890. Not the least significant fact stated in this *Bulletin* is that its deductions are based on returns made from 11,666 saw-mills! What chance has Nature, when to this horde of hungry saws must be added all those others whose operations were not known by or reported to the officials?

THE ARCHITECTURE OF SICILY.

UNTIL now we have been unable to find space for the following extracts from the very full and interesting paper read some months since before the Architectural Association by Mr. W. Howard Seth-Smith, F.R.I.B.A.:

SICILY may not be the best destination of a young student of architecture, on account of the very intricate problems its post-classic architecture presents. To the older architect, however, all this only intensifies the interest, and sets him to work till his mind is as tolerably clear as to the origin, as his sense of beauty is awake to the charm of its wondrous buildings of the twelfth century. . . .

Situated in the direct and only sea route from the east to west and northern Europe, Sicily was naturally among the earliest lands to be colonized. Moreover, its great beauty, its fertility, and good climate and strategical position made it the envy of all nations from the earliest Grecian era to modern times. It is not difficult, therefore, to explain why it has been termed "The Battlefield of the Nations."

Phœnicians, Etruscans, Greeks, Romans, Byzantines, Saracens, Normans, and Spaniards in succession have struggled in long and deadly conflict for supremacy over the fair and unhappy island, only, in most cases, to enjoy a brief or partial occupation. If we expect to find many monumental evidences of these successive occupations we shall be disappointed, for with the exception of those of the Greek, Roman, and Norman periods scarcely any traces remain. . . .

In 1016 forty Norman knights, returning from Palestine, stopped at Salerno in South Italy, then in the hands of the Lombard rulers, and found the town hotly attacked by Saracens. Encouraged by their aid, the Lombards took heart and the Saracens were driven to their boats.

The Normans, ambitious of conquest in this fair land, made several expeditions which resulted in 1040 in their establishment at Melfi, and in 1053 the Normans were confirmed in their possession of most of South Italy, under Robert Guiscard, one of the many sons of Tancred de Hautville, of Normandy, and received the Pope's pardon. These rude warriors, who had not blushed in the beginning of their career to follow the trade of highwaymen, and were absolutely illiterate, here became the enlightened promoters of knowledge and progress, encouraging with enthusiasm at their Court, and throughout their territories, letters, arts and science without regard to differences of race or religion.

Count Roger, the brother of Robert Guiscard, finally completed the work of conquering the Saracens and inaugurated, in 1090, the most brilliant period in the history of Sicily. The population he found there was, as in South Italy, composed of Greeks, Lombards, Italians, Arabs and Jews, who had enjoyed under Saracen rule an extraordinary measure of liberty, each race retaining its own language, and to a great extent its civil and religious customs. This tolerance was imitated by the Norman conqueror. The Greeks were still allowed to adhere to the code of Justinian, the Lombards to that of Rothario, the Saracens still took their official oaths on the Koran, and the Normans brought in the Frankish laws and customs. Roger set himself to work to pacify and develop Sicily just as his brother had in South Italy. He created the beginning of a civilization which had no equal in Europe. He had as a foundation the Arab fineness and intelligence consolidated by 200 years of continuous enlightened administration. "Christians and Northmen adopted the habits and imbibed the culture of their Mussulman subjects. Nor did these Scandinavian sultans of Palermo cease to play an active part in the affairs, both civil and ecclesiastical, of Europe. As hereditary legatees of the Holy See they dispensed benefices and assumed the miter and dalmatic, together with the scepter and the crown. The commander of Roger's navy was styled "emir" or "ammiraglio." The workers in his silk factories were slaves from Thebes and Corinth. His charters ran in Arabic as well as Greek and Latin. His jewelers engraved the gems of the Orient with Christian mottoes in Semitic characters. His architects were Mussulmans who adapted their native style to the requirements of Christian ritual, and inscribed the walls of cathedrals with Catholic legends in Cuphic language. The predominant characteristic of Palermo is Orientalism. The Saracens had their own quarters in the towns, and their mosques and schools. Count Roger found a machinery of taxation in full working order—a whole bureaucracy, in fact, ready to his use. In applying this machinery he became the richest potentate in Europe. In this court life men of letters played a first part three centuries before Petrarch taught the princes of Italy to respect the pen of a poet."[1] . . .

This tolerance, of the Saracens especially, is all the more remarkable when one recalls the fact that the Crusades, with all the animus they implied towards Mohammedans, were contemporary, but it also suggests the long and close contact of East with West which may explain in some degree the phenomena we are about to examine. Another point to bear in mind is that the second great period of Byzantine art was co-existent with the creation of these Sicilian monuments, that the mosaic decorations of such churches as S. Mark's, at Venice, were not yet completed, and those of the Church of the Saviour, at Constantinople, and others at Jerusalem and Bethlehem, and S. Front, at Périgueux, were in progress. . . .

In all these instances the Normans allowed the monument tc be built in the style and with the decorations familiar to the peoples they governed. The pointed arch here first introduced to them became general, but it was the arch of the Saracens, broad, high-stilted, and without mouldings and had no relation whatever to the use of the pointed arch of the North of Europe, which was even then beginning to be introduced in the monastic architecture of Italy. Nowhere in Sicily is there any instance dating from this period of an interior which has any hint of a Gothic system. The use of the intersecting vault is confined entirely to the small bays of the aisles or porches, while the naves, where not domed or covered by the equally Oriental stalactite ceiling, are invariably covered with an open-timber roof. . . .

Even without their gorgeous color, the lighting of these churches would be fine. The windows of the clerestory and aisles, of nave and transepts, are so small as scarcely to be seen in perspective, and give depth and mystery to the ceilings and interspaces; these masses of deep dark and half-tone being repeated beneath the ambone and organ-gallery, and in the semi-domes of the apses, while a flood of diffused light descending from the dome windows forms a splendid contrast and throws into high light the clergy in their sumptuous robes and brilliant accompaniment assembled below, their forms and colors being reflected, as it were, in the series of mosaic figures of saints and angels depicted in the mosaics above. In no other interior which I have seen is this contrast of light and shade so fine, reminding one of the Spanish cathedrals, but the prevailing gloom of a nave so decorated would not have been justifiable in the Middle Ages, except in a private chapel.

The great principle of "breadth" is carried to perfection. I need not say that the glazing of the windows is quite without color—another most important principle. Any stained-glass would have confused the scheme of wall-coloring. Everywhere the effort to obtain diffused rather than direct sunlight for the decorations is apparent. There are practically only two great divisions of the composition, the upper and the lower portions of the church, the upper being entirely covered, walls, arches, domes, vaults, and even soffits of arches, with a wealth of color, the lower kept quite quiet yet sufficiently broken by line or color (without pattern) to harmonize with the other portions. For instance, the mosaic pavement, inlaid with circles of serpentine and porphyry, surrounded by winding bands of Alexandrine work, is comparatively cool and subdued, and of geometric design; so is the frieze which separates the great vertical slabs of cipolino marble, 14 feet high, from the pictorial mosaic above; these slabs, being formed into panels by bands of geometric mosaic resembling those in the Alhambra and in S. Sophia, while the marble columns are enriched with fluting to harmonize with their richer-toned granite neighbors and other surroundings.

Nowhere are they (the mosaics) permitted to be within 14 feet of the observer. The color spaces are not broken up by architectural features such as mouldings, but divided by bands or lines of the same material. Every angle or projection is rounded off, and the mosaic carried round it, obviating sharp lines of light, and giving beautiful gradation between the different surfaces. Even the wall-surfaces themselves are not flat; whether this is due to the method of fixing, or was intentionally arranged in preparation of the surfaces for the tesseræ, perhaps expert mosaicists can tell us. We only know the result is excellent.

These wall-pictures are of the greatest variety and beauty, the ground is all gold, and the figures have much expressiveness and dignity without the rigid formality of most of the Byzantine mosaics. Some are doubtless contemporary with the structure,

[1]John Addington Symonds.

but the greater part were added during the reign of William I., the son of King Roger, before the end of the twelfth century, and all have been more or less restored, as have also those of the Martorana and of Monreale, the madders in the draperies harmonizing beautifully with the porphyry columns and discs. The inscriptions are in black, and are both in Greek and Latin, and silver tesseræ are used in parts. The silver band of the cupola bears the date of 1143. The organ-gallery is a most beautiful composition in porphyry and serpentine white and red marbles, with gold glass, its design closely following the examples we find in Ravello and Salerno cathedrals. . . .

The decorators of the late period of the Roman Empire well understood pictorial mosaics in marble, and we have very beautiful examples in Rome of this work, in the apse of Sta. Prudenziana, executed in the fourth century.

The ground was then mostly in blue, very little glass was used, and the figures were thoroughly Roman in type. When the seat of Empire was transferred to the East in 330, Constantine's liberal patronage of the arts in Constantinople, and particularly of mosaic amongst so artistic a people, soon brought the beautiful art to perfection.

When in 402 Honorius transferred his capital to Ravenna, this town produced the finest mosaics of the earlier period, up to the middle of the sixth century. S. Sophia was also completed in this century. Although some good examples can be seen in Italy, proving its continuity with varying success, and in spite of the set-back resulting from the iconoclastic movement, it was not till the eleventh and twelfth centuries that the great revival came, of which S. Mark's, and a little later those in Sicily, are so eloquent. The earlier mosaic work in S. Mark's, late tenth century, is, however, hard and rigid in detail, compared with that executed in the twelfth century in the same church and at Torcello, and here in Sicily.

In no spot in the world can the principles and methods be more successfully studied than in Sicily, those at S. Sophia being largely hidden from view behind Mohammedan whitewash, or destroyed, and much at S. Mark's having been restored out of recognition, or having given place to imitations of painter's art.

These decorations of the Palerman churches represent the zenith of Byzantine mosaic art of the Second Period. Nothing finer had been done before, even at Santa Sophia, or S. Mark's, Venice. Nothing so fine followed, and the ambition of the Renaissance painters to reproduce their naturalesque art in this permanent form, thus divorcing it from the conventional limitations imposed by the material, was soon to destroy tradition and its practice. It is only in our day emerging into new life by the discovery of its true principles of design, method of fixing, and by the revival of the manufacture of the enamel glass by such firms as Messrs. Powell, while Sir William Richmond, Messrs. Crane, Anning Bell, Clement Heaton, Spence and others are working on the right lines, and already giving us good work, both internal and external, in spite of many adverse conditions. A school of mosaic-workers is thus arising in England, which we anticipate will lead the art in Europe, and we may hope that, before the Westminster Cathedral mosaics are commenced, the empirical stages of the revival will be passed.

These Sicilian mosaics are kept sufficiently distant from the eye to prevent an unpleasant sense of the coarseness of the material and its joints, and to blend its irregular lines and surface into a rich and harmonious whole, full of variety and accidental beauty, while the scale of the figures and geometrical ornament is large enough to be read pleasantly by the multitude worshipping in the church. The lighting is arranged with great skill to answer the latter purpose, but is not sufficient to kill the coloring, and the windows, always of plain white glass, are generally in such positions as to secure diffused rather than direct light, and low down to give profundity and richness to the surface above.

The Byzantine style is the architecture best suited to the display of this decoration, since the curved surfaces of its domical vaults produce the maximum effect in graduation of light and shade, and the greater the width of the building the better is the effect. This explains the supremacy of Santa Sophia at Constantinople. . . .

The method of execution employed in Sicily and elsewhere in mediæval times was as follows: A coat of fine lime mortar was spread on the wall, upon which, when fresh, the picture was broadly painted in fresco in the proper colors. The painter was immediately followed by the mosaicist with the cubes, which were embedded in the soft mortar, and pressed to an even surface.

Here and in the interior of S. Mark's, Venice, the decorations enjoy the necessary freedom from rivalry with architectural features such as mouldings and stone enrichments, which disconnect the scheme and look poor and mechanical in juxtaposition, unless the carving is of very special delicacy, to harmonize as it does, fairly well, for instance, in S. Vitale at Ravenna, and in the atrium of S. Mark's, and as it does *not* at St. Paul's, London. In these Sicilian Norman churches the mosaics cover the entire wall-surfaces, domes and vaults, and even the angles of the archivolts are all rounded off to carry it to the soffits of the arcades. The ground is nearly all of gold, not the hot yellow gold of modern mosaics, but low-toned, soft, rich, never flashing, full of play of color from pale lemon to rich orange (according to its lighting), and the decorative designs are bright in tones that do not give the effect of patches of dark on a light ground.

The pallete used is a very limited one, greys and grey-blues, violets, soft greens, madders, with scanty use of silver, dark reds and russets—in fact, Nature's scheme of color at her most beautiful and restful season of *winter*. A scheme deliberately adopted and perfectly adapted to the heat and glare of the climate.

The size of the cubes averages nearly an inch square for the larger surfaces, and about three-eighths of an inch for faces, hands, etc. The mediæval method of cutting up the cakes of enamel-glass with chisel-like hammers produced the great irregularity in the cubes which, with their corresponding variety of joint and surface, gives such a subtile charm to old work, compared to the modern machine-cut cubes. It is obvious such a material must impose limitations on the drawing and texture. . . .

With the Norman work of the eleventh and twelfth centuries the development of architecture in the southern provinces of Italy comes to an end. In the great Gothic movement of north Italy, in the greater Renaissance movement which followed it, the south had no part. It was anticipated in Sicily. . . .

Up to this time the only domestic architecture in Europe, with very rare exceptions, had been that of the military castles. But in Sicily the examples of the luxurious Arabs were too attractive, and the arts which had been so lavishly employed in the church were turned to account in beautifying and softening the domestic life. Palermo became a second Cordova, with palaces, villas and pleasure pavilions standing in parks and gardens, with fountains and statues. Only the Torre della Ninfa remains of the Royal Palace, containing a large hall which still bears witness to the interior luxury of the King's house. Even as early as the first quarter of the twelfth century the walls and the groined vault were all adorned with mosaics.

The Saracenic characteristics of the baths at Cefala (about twenty miles south of Palermo) are, with slight modifications, those of all the Norman civic buildings in Palermo. The earliest were two pleasure palaces built by King Roger, about 1120, for use in summer and winter respectively. Of La Favára, the winter villa—little remains excepting the interesting little chapel. The palace stood within grounds planted with citrons, oranges and palms, and the whole enclosed within a great moat in which floated the gilded gondolas of the King and ladies of his court. The summer palace, known as Minenio, was two miles west of the town.

The more familiar examples of this Norman-Saracenic style are the two palaces built by William the Good and William the Bad, the Ziza and the Cuba, in which the Normans adopted the Saracenic domestic architecture and the kindred arts, especially that of formal landscape-gardening and the use of water.

The Ziza, built of ashlar brown sandstone with close joints, measures 115 feet by 62 feet and is 80 feet high. There are three nearly equal stories marked by small string-courses. The central arch of the principal front is 30 feet high, and the inner order is carried on coupled jambs of fine marble. In the lower half of each arch was originally a coupled pointed window with a smaller window between the arch heads, and the wall was crowned by a parapet the divisions of which were filled with Cufic inscriptions, and enclosed, as in the baths of Cefala, between two horizontal bands of Byzantine carving. The central arch leads through a vaulted vestibule into a hall about 22 feet square, with a deep recess on each of the three sides. These recesses are covered by elaborate Saracenic vaults, as at the Alcazar at Seville and the Alhambra at Granada, and their walls were faced with mosaics and plates of marble. These decorations remain in part. The central hall and vestibule have the height of two stories. The space on the sides of the building is divided into apartments communicating with each other by ample staircases.

The palace stood in the midst of pleasure gardens. Opposite the main entrance was a fish-pond surrounded by a square pavilion, which has now disappeared, like that of the Cuba, which still remains. The Arabic inscription on the parapet of the Cuba gave the date of the building as 1182. The planning of this royal villa appears to have closely resembled that of the Ziza. Of the various pavilions adorning the grounds La Cubola only remains.

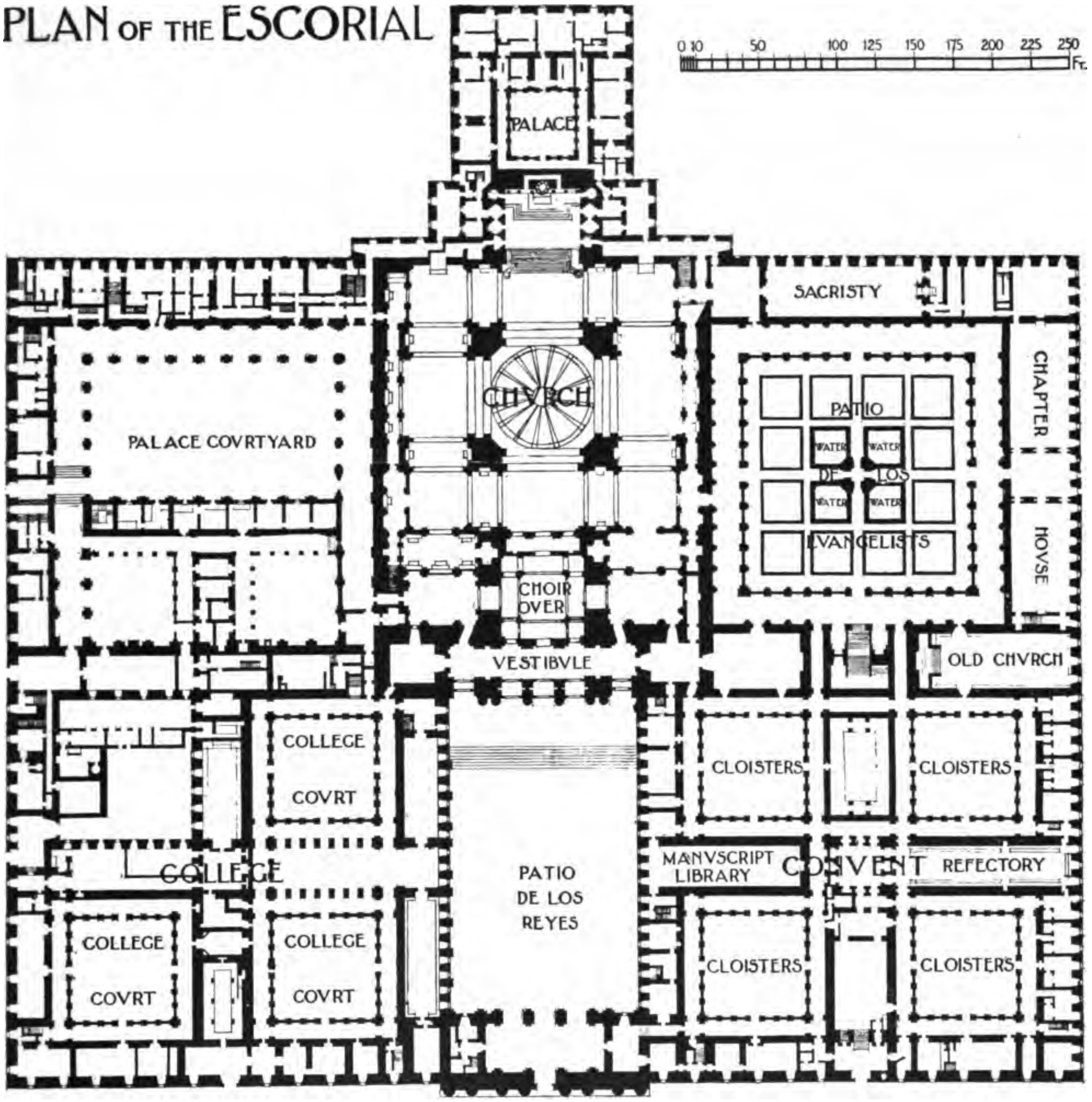
A curious hiatus in the art of Sicily is the almost entire absence of architectural wrought ironwork of any merit, ancient or modern. The best I saw was in the screens between the chapels and the nave in the Cathedral of Ortigia (Syracuse). This is the more curious considering how beautiful is the ironwork used to adorn the axle-trees of the carts in many of the towns, notably in Palermo (where they are also profusely decorated in color) and in Taormina.

THE ESCORIAL.[1]

We now come to the Escorial, and after a brief description we will pass on to the civil architecture of the Plateresque period.

Architectural taste at the present day is somewhat more in accord with the traditions which led to the production of this mighty building, and, if I mistake not, architects are more disposed to favorably criticise its design and construction.

Few buildings of the importance of the Escorial have been more universally maligned by the general critic. It has not only been pronounced a failure, but also considered devoid of any artistic merit. Even the late Mr. George Edmond Street did not deem the Escorial worthy of a visit, as, indeed, being a great revivalist, his sympathies were entirely opposed even to its consideration. He refers to the Escorial in the following terms:



The architecture of the Norman in Sicily covers a period of little more than half a century. Yet in that time it had exhibited a logical consistency and a wonderful union of strength and grace. Strictly speaking, the style had no development. No architecture ever expressed more fully and clearly the peculiar character of its age and people. The strength of the Norman, the fineness of the Greek, the luxury and grace of the Arabian were exhibited not more conspicuously in the social and political fabric than in the churches and palaces the Williams left to their unworthy posterity.

"As far as the building is concerned, it is enough to know that Herrera designed it, to be satisfied that it will be cold, insipid, and formal in character, and the glimpses I had of it as I passed in the train amply justified this expectation." No doubt this vast structure, stripped of most of its furniture and ornamentations, and deserted by the thousands of people who formerly thronged its apartments, cloisters, and courtyards, strikes the ordinary visitor as being most depressing, but to the architectural student

[1]Extract from a lecture by Mr. A. M. Prentice before the Architectural Association.

the study of the structure should be of intense interest. The masterly way in which the building is executed, the jointing of the granite work, the manner of vaulting the large areas, the means of carrying water off the roofs, the underground vaults, and finally the elaborate system of conduits and ducts for supplying the building with water, are all subjects worth investigating.

After a careful consideration of its purpose one can only come to the conclusion that the building has never been properly understood. The character and genius of its founder is stamped on every stone. Philip II., that stern but deeply pious monarch, who looked on the world with a mind tainted with melancholy, founded the Escorial as a temple, a cloister, and a tomb, and not a pile built for ostentation and show. His object was to carry out the will of his father, Charles V., in constructing a royal burial-place, as a solemn act of gratitude to his patron saint St. Lawrence, for securing him the victory at the battle of St. Quintin, on whose day it was fought. For about two years he searched for some spot in the vicinity of Madrid possessing the desired quality of solitude, and at last fixed on the wild, rocky, and scantily-wooded slopes of the Guadarrama, a suitable frame and background for such a structure, which seems to form as it were a part of the landscape in which it is set.

The building forms a rectangle measuring about 680 feet long and 530 feet wide. On reading the many authorities on the subject, one is perplexed at the great divergency of opinion in respect to its size. No two authorities seem to agree as to its height, length, or breadth. I have therefore taken some trouble to prepare a plan, which I believe to be fairly correct, to a scale of one-eighth inch to a foot, with the hope that it will convey some idea of its vast proportions.

As a plan I consider it one of the finest ever created by man, and well worthy to rank with that of the Baths of Caracalla or the Palace of Diocletian at Spalato, which latter it equals in general dimensions.

The architect first entrusted with the design was Juan Bautista, of Toledo, who had studied in Naples and Rome, and was summoned by Philip in 1559 to prepare the plans. In 1563 the first stone was laid, and the building was pushed on rapidly till its completion, twenty-one years after, while the cost was probably equal to about £10,000,000 of our money. Perhaps the true designer was Philip himself, who was a man of great and simple taste. Besides being a generous patron of the arts, he went into every detail most minutely, and criticised and often docked the designs submitted to him of all that seemed to him over-rich or too showy. He used to come frequently from Madrid to watch the progress from the summit of a hill close by. The characteristics of the Escorial are beautiful grouping of towers, large proportions, admirable harmony and simplicity of design, massiveness, and grandeur. It is almost impossible to put one's finger on any detail and say it is out of place or unnecessary. In the center is the church with its great dome and two western towers, facing the large internal court known as the Patio de los Reyes. To the right is the convent, and to the left is the seminary; while the palace courtyard and palace proper lie to the east and northeast of the church. The interior is divided into many courts, from the center of which rise two smaller towers with slated roofs. In addition to this, four massive square towers mark the angles of the building. The west and north sides have a fine paved *lonja* or platform and are flanked by extensive ranges of outbuildings, built at great cost to provide accommodation for strangers.

The block facing the western façade of the Escorial is called the Companna, of which the most remarkable feature is a spacious cloister 200 feet square. The building is taken up with cells for lodging strangers of rank. The upper part contains an infirmary. In the lower part are shoe-wards and storehouses and large refectories, besides mills and granaries.

The other range of houses on the north side to the left contains apartments for officers and servants attending the Court. Each of these houses is divided into three interior courts, and adjoining is an elegant chapel for the spiritual advantage of those who live in the neighboring buildings.

On a closer inspection of the Escorial the windows appear small and devoid of any ornamentation but they mostly light unimportant apartments ranged on the outer walls of the four great façades. Herrera probably considered the designing of the general mass of the building of more consequence than the grouping of the windows, besides, the heat of the summer and the intense cold of the winter had to be considered.

The main features are accentuated in an appropriate manner, and the Doric order is introduced to mark the center of the western façade, and forms the main entrance to the Court of the Kings.

Shortly after the foundation-stone was laid Bautista de Toledo, the architect, died, and his pupil, Juan de Herrera, succeeded him. This no less eminent architect made numerous happy alterations, but without deviation from the original designs to any great extent. He was also assisted by Antonio de Villacastin, and the building, rapidly progressing, was completed on September 13, 1584. On the same day of the same month Philip II. died here in 1598, having lived in this vast convent fourteen years. A dreadful conflagration happened in 1671. According to Francisco de los Santos it first began from so small a cause as a chimney taking fire, but the wind unfortunately carried the sparks to the roofs, and the fire began, and continued fifteen days without intermission, during which much of the structure, together with four grand towers, fell; but the church, the royal apartments, the principal library, together with many paintings and pieces of furniture, were saved.

The whole was rebuilt with superior magnificence by Charles II., to be again divested of many of its treasures by the French during the Peninsular War. Other restorations followed, and the interior still contains many beautiful objects of interest.

Passing through the great atrium, or Patio de los Reyes, the church is entered by a large vaulted vestibule formed under the choir. The wide flat vaulting is most skilfully executed, and is a triumph of stone construction. Philip II. was most doubtful of its solidity and ordered a central pillar to be added, but Herrera persuaded him to abandon the idea.

MOVING THE LUXEMBOURG COLLECTIONS.

THE following translation of an article in *L'Illustration* by M. Gustave Bahn was made recently for the Boston *Transcript*:

THE wretched conditions under which the works of living artists are exhibited at the Musée du Luxembourg are at last attracting serious attention.

The lack of room—evident at first glance as soon as you cross the threshold and enter the hall of sculptures, where statues, jumbled together in a sorry tangle, seem to gesticulate for mercy—and the universal crowding that prevents the display of many beautiful pictures and forces many others into exile in the provinces—to the great anguish of the artists—are perhaps not the worst shortcomings of that erstwhile orangery, which was abruptly raised (though as a mere makeshift) to the dignity of a museum. And only think what would happen if fire broke out in those crowded halls, from which you can escape only by a single door!

At least ten remedies have been proposed one after another for this grievous situation. Some of them were ruinous, others impracticable. It actually seemed that nothing could ever be done, when an unlooked-for solution was brought to the consideration of the Administration des Beaux-Arts. You may readily imagine the delight with which that body and especially M. Léonce Bénédite, the devoted conservateur of the Luxembourg (and therefore the first victim of the evil) looked over this scheme for its salvation: In a few months, the museum of living artists is going to move into the building formerly occupied by the Seminary of Saint-Sulpice and now left vacant as a result of the separation law.

Viewed from the outside, as you pass through the Place Saint-Sulpice, that massive square building, with its black walls pierced with little semi-circular windows, half-prison, half-college, displaying a melancholy façade behind its small and unwholesome garden—that perfect but far from elegant type of the religious architecture of the First Empire—would seem as unsuited as the Luxembourg orangery itself to the new rôle imposed upon it.

But you get an altogether different impression when you pass beneath the scanty porch that shelters its entrance. M. Dujardin-Beaumetz, Under-Secretary of State for Fine Arts, needed only a hurried visit to those courts and those cold, bare galleries—in the company of M. Léonce Bénédite and M. Dernaz, architect of the Luxembourg—to see how admirably the place could be adapted, with a little ingenuity, to its proposed purpose. By knocking out a few partitions light and air could be let into this dismal retreat, and a superb and perfectly satisfactory museum created. A rough estimate

puts the cost of the alterations at the low figure of $160,000. The rebuilding of the museum in the gardens of the Luxembourg would cost above a million, even with the strictest economy.

When you cross the vestibule which leads from the outer porch and in which there must of necessity be built a broad stairway—whose enclosing walls will jut out a little upon the space outside—you come to a large square court, around which runs a cloistered walk, with a colonnade of stout pillars along its inner edge; the buildings rise in distressing regularity on its four sides. This court, when given a glass roof, a winter-garden and mirror-like pools of water, will become the loveliest hall of sculpture imaginable.

A corridor, passing through the building at the rear, opposite the entrance that has just admitted us and similarly provided with three broad bays, leads straight to the chapel.

With its sculptured arches and in spite of its walls covered with frightful paintings signed by one "Paulhe, de Béziers, Hérault," this chapel—bare and austere, like the rest of the edifice—has nevertheless a degree of grandeur. It is the oldest portion of the Seminary, the last vestige of the buildings of Louis XIV.'s time. There Cardinal De Bérulle sleeps his last sleep, in front of the altar, beneath a copper slab polished by the tread of many feet. It will become an extension of the sculpture hall and will shelter works requiring a softer atmosphere and a light less garish than that in the hall itself. The loggia at the rear of the chapel, opposite the altar, will be uncovered and freed so as to let in more light, and likewise the semi-circular tympanum above the altar, when opened and filled with gleaming glass (which the genius of an Albert Besnard might make a beautiful work of art) will afford additional illumination in a room now so dim.

And now let us note a detail, for it will give you an idea of what the museum will gain by moving to St. Sulpice: The chapel, nearly one hundred feet long and forty feet wide, in itself, yields an area almost as extensive as that now available for sculpture in the Luxembourg.

All around the court, the well-known black buildings present a uniform arrangement—a ground floor surmounted by three stories of cells, each story provided with huge corridors and lighted by windows looking out upon the court or upon the Place Saint-Sulpice, the Rue Féron of the Rue Bonaparte. The front rooms on the ground floor, facing the Place Saint-Sulpice, will serve as offices for the curators, and as cloak-rooms—rather more commodious than those rudimentary contrivances now in use at the Luxembourg—for the guardians and the public; in the three other sections of the building there will be a room for the sale of catalogues and halls for architectural expositions and displays of prints and drawings.

In the stories above, the partitions will be taken down; the floors of the two topmost stories will be removed, the roof partially transformed into skylights to secure light from above, and thus we shall obtain galleries nearly thirty feet high for the exhibition of paintings.

These are only the rough outlines of the scheme for adapting the Seminary to the needs of a museum: when it comes to be worked out, it may be subjected to various alterations of detail and many modifications. Efforts will be made to get control of adjoining buildings and to establish important annexes—a lecture-hall, for instance, and studios, together with a refectory for the guardians and a residence for the guardian-in-chief. There is even a plan for founding a buffet-restaurant, like the one at the Bibliothèque Nationale, which will be a great convenience to visitors. Finally, the heating arrangements will receive the most careful attention.

Nor is this all. Behind its grim walls, the vast enclosure of the Seminary hides not only several little courts or yards, but also a very beautiful garden, partly terraces, which stretches along the Rue Bonaparte and which, when properly laid out, planted, and cared for, and when adorned with marbles and bronzes, will on fine days be a charming place to rest and to dream in.

Who knows but some ambitious minds are even considering the seemingly quixotic, but nevertheless very seductive, idea of seeing the future museum divested of its surrounding masses of private buildings and left standing by itself in a large park? But there's plenty of time to think of that. Perhaps it will be our great-grandchildren, and not ourselves, who will accomplish it.

At present the essential thing is to go ahead with what most needs doing. As the Seminary was originally built for the Sulpicians by the State, it seems that its possession can be secured fairly promptly; and so the Ministers of Public Instruction and Fine Arts will soon be prepared to lay their plans before their colleagues of the Cabinet. The necessary outlay, as we have seen, will be comparatively small, and Parliament can be relied upon to give the artists an additional mark of its constant sympathy by voting the appropriations by acclamation.

Considering the general approval of the project, we may expect—if circumstances are reasonably favorable—to see the new museum inaugurated within two years. It will be only fair to carve upon its portals, as a tribute of gratitude, the names of MM. Aristide Briand, Dujardin-Beaumetz and Léonce Bénédite, for they will certainly have conferred a benefaction upon French art by this speedy, economical and at all points splendid solution of a problem which the most optimistic were beginning to regard as insoluble.

EARTHQUAKE EFFECTS IN MANILA.

THE history of Manila seems to be little else but that of fighting and earthquakes, and the latter seem to have been the more disastrous. Before the Spaniards came it was a city of bamboo huts, so that an occasional shaking-up did no more serious damage than to deposit the occupants of the shacks unceremoniously upon the ground with their nipa roofs about their ears. To replace their loss meant little more than a few trips to the nearest bamboo thicket. Instinct and an aversion to hard work prevented them from erecting any structures that were worth preservation.

The Spaniards, however, calmly ignored earthquakes in their scheme for a city, and went ahead and replaced the nipa shacks which they found along the Pasig River with fine stone structures, such as only a Spaniard would have the patience and the energy to build in the tropics at that time. Although pretty severe shocks were frequent, no considerable damage was done to the city till St. Andrew's Day, November 30, 1645, when the ground within the city is said to have cracked open and belched forth fire, and the Pasig River was thrown out of its channel. About all the churches, convents and other large stone structures fell to the ground, and more than six hundred persons were killed. For many years subsequent, the people were afraid to erect any more stone buildings, and the large and beautiful structures that had won for the city the name "Pearl of the Orient," were not replaced.

For a couple of centuries there were no more really violent earthquakes in Manila, and the city was gradually rebuilt with stone and brick. Then in 1863 the experience of two hundred years before was repeated, with even added horrors. The earthquake threw down the cathedral (the building has been demolished three times in all in this way), and destroyed twenty-five public and 600 private buildings. Four hundred people were killed outright, and 2,000 more were injured by the falling buildings. In one church alone, more than a hundred people who had taken refuge about an image of the Virgin were killed by the falling of the roof. The loss of property was estimated at $8,000,000, a sum representing double that amount at the present time.

Besides these two great earthquakes, Manila has been severely shaken again and again by the unstable earth upon which it rests, and it seems reasonably certain that, sooner or later, it will be destroyed again, as many of the natives firmly believe. And yet, the Americans, with that unbounded optimism which has been such an important factor in making them what they are, are proceeding to make Manila the metropolis of the Orient and the most beautiful city east of Suez. The new waterworks alone will cost $4,000,000; the harbor improvements (now practically completed) more than $4,000,000 more, to say nothing of the enormous outlay for the new sewer system, park system and magnificent insular and city buildings being designed by Mr. D. H. Burnham, the famous architect and landscape gardener. With an insular ice-plant that alone cost $1,000,000, and other buildings to be constructed on even a more costly scale, the $8,000,000 damage done by the earthquake of 1863 would be as nothing compared to the amount of wealth that would be wiped out in case of a third great catastrophe after the present plans for the improvement of the city have been carried out.

Until the San Francisco disaster, the contemplation of another serious earthquake in Manila had been so little considered by the Insular Government that the advisability of constructing public buildings out of steel had been given no special consideration. With the San Francisco affair as an object-lesson, however, it seems pretty certain that none of Manila's public buildings now contemplated will be constructed of stone.—*B. K. Daniels in Boston Transcript.*

ILLUSTRATIONS

HOUSE OF REV. HOWARD T. MOSHER, ALEXANDER STREET, ROCHESTER, N. Y. MR. CLAUDE F. BRAGDON, ARCHITECT, ROCHESTER, N. Y.

TELEPHONE BUILDING, ROCHESTER, N. Y. MR. J. FOSTER WARNER, ARCHITECT, ROCHESTER, N. Y.

HOUSE OF W. T. COATSWORTH, ESQ., SOLDIERS' PLACE, BUFFALO, N. Y. MESSRS. LANSING & BEIERL, ARCHITECTS, BUFFALO, N. Y.

HOUSE OF C. W. GOODYEAR, ESQ., BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.
ENTRANCE TO THE SAME.

ALBANY CITY SAVINGS BANK, ALBANY, N. Y. MR. HENRY IVES COBB, ARCHITECT, NEW YORK CITY.

STATE BANK, ALBANY, N. Y.—BUFFALO SAVINGS BANK, BUFFALO, N. Y. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.

The first mentioned of these bank buildings is an old structure, the interior of which was restored some years since by Mr. Marcus T. Reynolds.

NATIONAL COMMERCIAL BANK, ALBANY, N. Y. MESSRS. YORK & SAWYER, ARCHITECTS, NEW YORK, N. Y.—NATIONAL SAVINGS BANK, ALBANY, N. Y. MR. MARCUS T. REYNOLDS, ARCHITECT, ALBANY, N. Y.

Additional Illustrations in the International Edition.

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NOTES AND CLIPPINGS

DIVERTING AN ITALIAN RIVER.—The matter of the Sele aqueduct seems to have lain dormant for some time. The project is to convey the water of the Sele from its source in the hills of Arellino and turn its flow from the Mediterranean to the Adriatic watershed. The stupenduous nature of the undertaking is only equalled by the enormous utility expected from it, namely, the conversion of an almost barren province into a flourishing agricultural region. A long and difficult sloping tunnel to convey the water will have to be constructed through the mountain, and the water having been conveyed through it will have to be distributed so as to irrigate the country, and provide the towns of the littoral with potable water, of which they are sorely in need.—*The Builder.*

MUST CONTROL ELECTRICITY.—An important decision affecting transmission of power was handed down by the New York Court of Appeals on February 19. It established the negligence of a power company which allowed an electric current to leak.

Mary L. Witmer, as administrator, brought suit against the Buffalo and Niagara Falls Electric Light and Power Company, and got a judgment for $7,495 for the death of her husband. A high-voltage current, through defective insulation, leaked out upon the wires which led into the Witmer home, in Niagara Falls, in September, 1903, and shocked Witmer to death. His wife sued for $25,000.

HOUSING IN BERLIN.—There is, however, a seamy side to Berlin, and this is one that most directly affects the welfare of the people in this domestic life. The question of housing has not been well solved, but, instead, has been wretchedly muddled, with the result that the poor people and people of moderate means are housed worse in Berlin than in almost any other modern city. This is largely, perhaps chiefly, due to a well-meant but ill-advised law which was enacted in 1887, strictly forbidding the erection of dwelling-houses more than five stories, or seventy-two feet, high. The idea was to prevent the erection of exaggerated "skyscrapers" and the consequent congestion of a great population on a small land area. But as land values increased the value of house property increased enormously. As it was forbidden to build higher above ground, people took to burrowing beneath ground, against which there was no law, until fully one-tenth of the people of Berlin were living in cellars beneath the level of the surface of the ground. Another evil result was the crowding of great numbers of persons into a single house by putting an entire family into each room. A few years ago about sixty-five thousand families occupied only a single room each—a state of affairs probably not paralleled in any other European city. The disastrous effects of these modes of living upon both health and morals can readily be imagined. True, the death rate of Berlin is not so high as in many American cities, but it is far higher than it should be in a city which is kept so clean and which has—excepting for the housing of the people—such admirable sanitary appointments. The Berlin death rate is 17.2 in the thousand yearly, against 15.6 in London, 15.8 in Hamburg, 14 in Antwerp, 13.8 in Amsterdam, 14.5 in Brussels, 14.7 in Rotterdam and 15.99 in Stockholm. On the other hand, the rate in Paris is 17.4, in Vienna 19.3, in Munich 20.1, in Dresden 17.8, and in Budapest 19.2. Berlin ranks, therefore, as an average city, but if the housing of the people were as well regulated as other matters it would probably have one of the very lowest death rates of all.

Something is now being done to remedy this evil. A few years ago it was discovered that in a single house only five stories high no fewer than one thousand persons were living, and that in the whole city there was an average of forty-seven persons in a house, while in London the average is only five! Since then a number of laws have been enacted on the subject, and millions of dollars have been spent by the Government in the erection of improved dwellings and in the assistance of building associations. With all that has been done, however, the situation is still bad, and rentals are higher in Berlin than in almost any other German city. A dwelling containing only a single room capable of being heated rents for about $60 a year, and one with two heatable rooms for $100 a year. From this may be estimated the rental of a dwelling with seven or eight rooms capable of being heated. Comparing Berlin with London, it may be said that a Berlin workman pays as much for a couple of rooms on the fourth or fifth floor of a flat-house as his London brother does for a whole cottage of six or seven rooms. This item seems to be the chief problem which the generally admirable administration of the Prussian capital has yet to solve.—*Berlin Correspondence of New York Tribune.*

UTRECHT CATHEDRAL FOR SALE.—The Amsterdam correspondent of the London *Pall Mall Gazette* writes to his paper of a remarkable proposal that is being made by the Protestant community of Utrecht that they should sell to the Catholics the ancient cathedral of the city, which is described as the largest Gothic historical building in the Netherlands. The idea was first mooted, oddly enough, by one of the Protestant pastors, Mynheer Gunning, who is regarded as the leader of the Protestant body in Utrecht. His grounds for making the proposal are strictly utilitarian. He estimates that the buildings would realize a million florins, with which sum it would be possible to build five new churches, and endow each with a living. It should perhaps be explained that the cathedral is said to be in a half ruinous condition. During a fearful storm in 1674 a great part of the nave collapsed, and has never been repaired.

State Archivist Mullen, who has made an elaborate study of the place, and has even prepared complete plans for rebuilding the nave, warmly supports the proposed sale.

MODERN AFRICAN LAKE-DWELLERS.—Major Powell-Cotton has found a strange people in Africa. They spend their whole time on the water of Lake Albert Edward. Their houses are all built on floating platforms anchored to long poles. The main floating village consists of thirty huts, while two others comprise ten and seven respectively. Some of these grass huts are built around a small square platform about twenty-five feet by ten feet. This forms the common backyard and practically the world of the children. Birds of all kinds—flamingoes, pelicans and marabou—fly around regardless of the presence of man, while groups of women, girls and children cluster on the edges of their floating homes. The people are healthy, well fed and good looking, and rarely marry outside their own community, for they say a land woman would be useless and unhappy if compelled to live in their lake villages.—*N. Y. Tribune.*

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SOCIETIES, PERSONAL MENTION, ETC.

FEW persons would be likely to deny that American architects are, as a rule, refined, well-bred and certainly rather decent individuals, quite unlikely, say, to sit down in shirt-sleeves and trousers stayed by a single soiled suspender to dine in public. But if they really possess a restraining sense of decency in one direction, how is it that, almost without exception, they are willing to show such brutal and indecent disregard in another direction for those other feelings of the bystander which are as easily shocked and offended as those which shrink and shrivel in the presence of a soiled shirt-sleeve? Let any New Yorker gaze out of his window in any direction and he will find his eye offended by the evidences of the brutal, indecent indifference of American architects, of the men who prate about art and beauty and try to impress upon their clients their own reverence for the sky-line. Everywhere, where things are supposed to be a little out of sight, in the treatment of roofs and party-walls, reveals, returns, parapets, elevator pent-houses, skylights and copings, chimneys and, above all, in the treatment, or rather the total neglect, of courtyard walls and the doors and windows that open upon them, he can see at a glance evidence enough to blast the pretence that the majority of architects have a maintainable claim to be considered not artists merely, but even men who have an understanding of decency and good feeling toward their fellow-men. Why is it that these unspeakable atrocities are to be seen on every side in this twentieth century in such a city as New York, do you ask? Pure thoughtlessness, simple veneration for the rule o' thumb. Can any better evidence be wanted of man's simian descent than is afforded by the shamefully crude and neglectful way in which New York architects treat the rears of their buildings, their unprotected sides, their frowzy roofs, their slighted court fronts, simply because they have always done so?

THAT it is merely a matter of simian imitativeness is made plain when, now and then, we come upon a building where its architect has really done his full duty, not only to his client but to the public, and has shown that he has taken to heart the story of Porthos and his baldric. We never pass along Fifth Avenue, near the Public Library, and see rising above its lower neighbors in a truly Acropolitan dignity the eastern façade of the Engineering Societies' Building, that we do not rejoice at the forethought of the man who prepared the competition programme and the unusual success with which the architects handled the problem, not only on this side but also on the rear, where that rear will always be visible from Bryant Park. The building, as a piece of rational architecture—decorated construction—is one of the most successful and dignified in the entire city; and here, if you please, we have a designer who not only can prate about sky-lines, but actually produce them, satisfyingly, simply and inexpensively. When one looks away from this building to regard the impertinent unconcern of the western wall of the towering Hotel Belmont, not far away, it is easy to comprehend that there really is a difference between tweedledum and tweedledee, and that the difference is not merely one of cost.

BUT, nerve-racking as is all the disheveled unkemptness of the upper levels of New York architectural achievement, it is not as depressing as the unconsidered treatment of the courtyards of hotels and apartment-houses. There is so vast an accumulation of architectural illustration that goes to prove that the courtyard in other countries has been the special object of the architect's most sedulous consideration, that it is not easy to understand why and how it is that similar spaces in New York should be bounded by walls of the plainest brickwork, simply punched full of the needful number of openings, all of the same size—and the meagerest at that, their grouping unstudied, their details unconsidered; nothing but a plain flush blank of coarse brickwork, with no variation of pattern effected in the bond, with never a string-course through the whole height, with single rowlocks for lintels, and jambs and sills ungraced by thought. It is distressingly humiliating that everywhere, even in so notable a building as the Home Club, on East Forty-fifth Street, the courtyard walls should be so neglected, when their proper handling would add so very much to the pleasure of those who have to spend their time in rooms that open on them. An oriel, a balcony, or mouch-

araby, a patterning in brickwork, a change of bond, a veneering of tile, an attempt at sgraffito, a little half-timber work, there are endless ways of making a departure from the bleak forlornness which now pervades the regulation city courtyard, making it, everywhere, as deadly depressing as the corridor of a jail.

THE New York *Evening Post* has of late undertaken to exploit at great length certain artistic scandals. Having amazed its readers by giving many columns of its space to the airing of a dispute between three brothers, painters, of recently acquired notoriety, it last week directed attention, and none too soon, to the Cathedral of St. John the Divine, on Bloomingdale Heights, New York. To ourselves and to most of the profession, we fancy, that undertaking has been a good deal of a mystery, as it has not been at all easy to perceive why, in view of what building processes are in these days, so little should have been accomplished in all these years, and why that little should not augur better for the final result. When, a month or so ago, we saw that Mr. Harry Hems had, in *The Building News,* indulged in some pretty savage criticism of the figure sculpture already in place upon the apsidal chapels, we set it down as merely an instance of purblind Britannic superiority that those interested in the matter could afford to smile over. But the criticism takes on another and far less agreeable aspect when the sculptor who modelled these figures, Mr. Gutzon Borglum, informs the *Evening Post* that not only was Mr. Hems right in his strictures, but that he was altogether too self-restrained in giving expression to them. In self-defense, Mr. Borglum now explains that the architects and building-committee, in spite of his own reiterated remonstrances, continue to allow the stone-cutters to follow his models at such distance or with such variation as their discretion or lack of skill allows. The situation is not usual, for one does not ordinarily find an architect siding with a contractor against a fellow artist, particularly when, as in this case, that artist has been willing, for one reason or another, to do a large amount of work at an extraordinarily modest rate. The situation is hardly improved when one of the architects assures the public through the reporters that there are no American sculptors competent to do the work as he thinks it should be done, or when the building-committee makes it known that the whole thing does not concern the public in any way. It seems to us, however, that, if the *Evening Post* representations are accurate, the treasure-chest of the Cathedral of St. John the Divine is likely to lack that public plenishing on which progress depends until building-committee and architects have been replaced by less petulant successors.

THE Philadelphia *Item,* which perhaps is not the best of authorities, published last week a very remarkable interview with the architect of the Pennsylvania Capitol. In it Mr. Huston is made to say: "What, however, proved to be the most serious factor in the whole transaction was the since much-discussed 'per-foot' and 'per-pound' rule, a legal provision of an arbitrary character, from which there was simply no escape. This rule is the result of a law passed about ten years ago, in force at the time this work was done, and still in force." Captain Delany, however, who was Superintendent of Grounds and Buildings for many years, says that no such law exists. But, supposing that it does, how much better it would have been for Mr. Huston's reputation if he had, at the first disclosure, made this extraordinary revelation instead of having to go for precedent so far afield in time and distance as to Paris and the Second Empire—and then find only a single instance of contracting by pound and foot at that.

IT is rather a misfortune that the case of Haydel *vs.* Gould, which had about it so many of the characteristics of a leading case of general value, should have been so handled in court and so presented in the newspapers as to have mainly the air of a *chronique scandaleuse.* Still, a case that has been carried up through the Appellate Division and the Court of Appeals of the State of New York without encountering a reversal of the lower court's decision is a very satisfactory "leading case," and, as "Castle Gould" is an easy name to keep in mind, the case is likely to be turned to hereafter whenever an architect finds that an unreasonable client seeks to turn him adrift and do him out of his just dues.

THE forestry matter is so big and so vastly important that there are many points of view from which it can be considered, but bathos could find no clearer definition than that afforded by the lumbermen and pulp-mill men of Maine, who just now are seeking to have established by law an open season for beavers! And yet all the beavers in Maine could not work the devastation that a single gang of lumbermen, aided by a portable saw-mill, can accomplish in one season. What the deforesting possibility of such an outfit is can be known from what is happening in Clearfield County, Pa., just now. Here, nine thousand acres of standing timber were bought two years ago, and one-third of it has already been felled, yielding fifty million feet of lumber, and in four years more not a tree will be standing there, the saw-mill wasting them away at the rate of two hundred thousand feet a day. It is disheartening, too, to find the Government not only careless and indifferent, but, more than this, actually compelling timber waste by legal enactment. To please the cigar-makers' union, a law has been passed that forbids tobacconists or others to make use of empty cigar-boxes, and so compels the wasteful and wanton destruction of a vast quantity of perfectly useful manufactured material and the consequent destruction of many trees out of which new boxes must be made. To be sure, many people will argue that, as the cigar-box is made from Spanish cedar that grows in Cuba, its waste is not one of our own economical problems; but modern commercial life does not recognize political boundaries and a waste effected in one spot has its reaction in many another. Another very serious matter, which even now is causing concern to those who really understand the absolute necessity of reforestation, is the difficulty, perhaps the impossibility, of procuring seed when at length the task of replenishing the forests shall actually be taken in hand.

THE ENGINEERING SOCIETIES' BUILDING, NEW YORK.

EARLY in 1903, Mr. Andrew Carnegie offered the sum of $1,000,000 for the purpose of providing a suitable building for the various engineering societies centering in New York. A year later the gift was increased to $1,500,000, to be participated in jointly by the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers and the Engineers' Club.

The expenditure of the donation was placed in the hands of a committee of twelve, three from each of the bodies named, and the only limitation made by the donor was that the money should be expended in suitable buildings, the land being purchased by the bodies interested.

One of the most important duties of the committee was the division of the gift in proportion to the requirements and objects of the two buildings. This delicate task was accomplished by allotting $1,050,000 to the Engineering Societies' Building, and $450,000 to the Club-house.

The site acquired for the Engineering Societies' Building is on West Thirty-ninth Street, north side, between Fifth and Sixth Avenues. The frontage covers five city lots, Nos. 29 to 33, the total front being 125 feet. This land has been bought with money advanced by Mr. Carnegie to the three engineering societies at 4 per cent. interest, the cost being $502,000, one-third of the amount being payable by each society. To the east of the property, light and air for the building are satisfactorily ensured by the purchase by the Club for its own protection of a large four-story private house of "restricted" height; the Club-house being in the immediate rear of the Engineering Building.

The Conference Committee spent its first year in disposing of the various questions arising in the acquisition of real estate, deciding upon the method of holding title to the property, making arrangements for the administrative details, and determining as nearly as possible the actual requirements of the proposed building. It then became necessary to select an architect. The worldwide fame of the donor, the magnitude of his gift, the national character of the engineering societies, and the great cost of the contemplated edifice, made the selection of an architect a semi-public matter of more than ordinary importance.

The plan of selection adopted was that of a "mixed competition," in accordance with what was understood to be the wish of Mr. Carnegie. In carrying out this plan, six architects of high reputation were invited to participate. Each of the invited architects was to be paid $1,000 for submitting his plan, whether it was accepted or not. In addition, other architects were invited to present plans, but without compensation, and the competition was also thrown open to all architects who for two or more years had been in the actual practice of their profession, under their own name. Four prizes were provided for the best of the non-invited architects in the "open" class. All plans were submitted anonymously, and the committee associated with itself as professional adviser Dr. W. R. Ware, formerly Professor of Architecture at Columbia University.

In July, 1904, the committee made careful examination of the plans thus submitted, at the rooms of the American Art League, New York City, twenty-six sets of plans comprising over 500 drawings having been received for the two buildings. The programme called for a handsome but not too ornate treatment of the Engineering Societies' Building, the side and rear walls to be reasonably conformable in architectural treatment with the front elevation, so that the edifice might have the aspect and character of a completed structure rather than that of a section of an unfinished block. All drawings were in India ink, on plain white paper, without color, to a scale of 1-16 inch to a foot, accompanied by a sealed envelope giving the name of the designer and a general description of the proposed building. After a very careful study of the numbered sets of plans, it was found that the unanimous choice of the committee, with the warm approval of the professional adviser, had gone to Messrs. Herbert D. Hale, of Boston, and Henry G. Morse, of New York, associate; who were forthwith appointed the architects for the building and who as the firm of Hale & Rogers, and H. G. Morse, associate, carried out the work. The award for the club-house was similarly made by the Conference Committee to Messrs. Whitfield & King, of New York.

The corner-stone of the building was laid in the eastern wall by Mrs. Andrew Carnegie on May 8, 1906. The time of completion was fixed for November 15, 1906. Offices were ready for occupancy on December 15, 1906; some were in use before the end of the year, and the entire building, though not quite finished, was ready for use January 1, 1907. This remarkable expedition was largely due to the fact that at no time did the architectural plans require important revision. A steel strike in the spring of 1906 lasted one month and a plaster strike in November about two weeks, but the building was erected within the specified time and within the appropriated sum, and the relations of the Conference Committee, the architects and the general contractor have been throughout of a most harmonious nature.

The frontage of the Engineering Societies' Building on West Thirty-ninth Street is 115 feet, and the depth is 90 feet. The property itself is 125 feet front by 110 feet depth. The building laws of the city of New York require that only 85 per cent. of the lot area shall be occupied by the structure on it. Advantage has been taken of this limitation to give the building a monumental appearance. It rises thirteen and one-half stories above the sidewalk to a height of 218 feet 6 1-2 inches. The exterior is built of limestone up to the auditorium floor, and of gray mottled brick and terra-cotta above. The treatment is restrained and dignified, but without severity. As the lower portion is devoted to auditoriums, the middle section to offices, and the upper part to the library, an effort has been made to accentuate these three separate parts of the building, with happy result, as shown elsewhere.

In excavating for the foundation, rock was found at from 27 to 67 feet below the curb line, and there are forty-six concrete piers in the foundation going down to solid rock. Two of these piers sustain a load of 3,000,000 pounds each in weight of structure alone, and the steel columns at these two points weigh 1,000 pounds to the foot. The steel plate-girders in the ceilings of the main auditorium weigh 48 tons each, and the steel lattice-truss on the sixth floor weighs 64 tons. The total weight of steel employed in building construction is 2,650 tons.

All the steel work in the building has been covered with from 2 to 4 inches of semi-porous terra-cotta, and the columns are grouted with concrete. The floors are built with terra-cotta 6-inch segmental-arch construction, overlaid with 5 inches of cinder-concrete. All exterior walls are furred with a 2-inch terra-cotta block, to prevent any possibility of moisture being driven through the walls.

Access to the building is gained by the central entrance on the street level to the first floor, by the western side door leading to the elevators, and by the broad driveway which encircles it completely, so that carriages can enter by the eastern covered arch, set down their occupants at a side entrance and emerge by the western gate. There are three elevator riseways in the main elevator-shaft, faced with an iron grille lined with wire-glass. On each side of this shaft wide stairways rise to the sixth floor of the building, and one leads thence to the library floor. A freight-elevator has been installed on the eastern side of the building, and a commodious service stairway on the north side rises the entire height of the edifice. At the first floor, a rear door communicates across the ten-foot areaway, in the open, with the café of the Club-house, and on the ninth floor, a flying covered bridge connects with the breakfast-room on the tenth floor of the Club-house.

The woodwork in the building has been reduced to a minimum. The large window sashes are built of cast-iron, and the other windows of wood covered with kalamined iron, such windows having only a small moulding in place of the usual wide trim and casing. All the doors in the basement, first floor and at the ends of the auditorium promenade are kalamined-iron fire-doors, and the exit door to the Engineers' Club is built of electroplated copper on wood. All the woodwork, including floors, sleepers, trim, etc., has been fireproofed. The windows up to the height of 100 feet are glazed with wire-glass, except on the Thirty-ninth Street front, thus bringing the exterior fire-hazard down to the lowest possible point. All finished floors throughout the building are of cement, marble or terrazzo, except the library, main auditorium and lecture-rooms, where maple has been used. The insurance rate of 15 cents for this building is the best proof of its safe construction and solid workmanship. Moreover, additional precaution against fire has been taken by placing an 8,000-gallon tank on the roof, with a stand-pipe at each end of the building, the tank being fed by two electric pumps.

All the walls and ceilings are painted in neutral tints, and the decoration is simple though carefully studied, especially with an idea to later development in the way of mural paintings, the setting of the names of distinguished engineers in plaques, niches for bronze or marble busts, panels for bronze tablets, etc. Opposite the elevator-shaft on each of the three founder societies' floors, the badge of the society occupying the floor has been executed in a heavy brass plate set into the terrazzo. The hardware throughout, in a subdued brass finish, is quite massive and is master-keyed for all doors. The mail-chute is ornamental and of the latest pattern. The driveway is defended by handsome wrought-iron gates specially designed, and over the main entrance a large bronze plaque has been set, bearing the words, "Engineering Societies," to explain the purpose of the building to passers-by.

The spacious first floor is laid with Tennessee marble tile, having a border in design of colored marble. The central court or main foyer is marked by twelve large columns of Swiss Cipolin marble. A short low flight of steps leads from the foyer to the elevators, and at will a metal grille is thrown across the steps so as to restrict or direct travel. Gold ornament is used sparingly for architectural accentuation, and the woodwork is in dark oak. Large chairs and lounges in red leather furnish the foyer, and similar furniture is used in the writing-room, smoking-room, reception-room and administration-room, which also contains three telephone booths associated with the "private-exchange" system. On the foyer walls, facing toward the main entrance, are two large bronze tablets, one bearing a relief portrait of Mr. Carnegie and the words of his second terse letter of gift of $1,500,000, and the other a statement to the effect that the land was given by members and friends of the three founder societies. On this floor also, at the rear, are receiving and shipping offices through which all freight and goods are handled. In time this floor will be graced with statuary, but even now it creates a most favorable impression as one enters the building.

Immediately above the first floor is the coat-room, laid out on a sectional plan so that several lines of persons may be accommodated at once on entering or leaving. Special toilet facilities are also provided on this floor, which virtually occupies the space that would otherwise be left blank by the slope of the main auditorium floor just above it.

The main auditorium extends up through two floors and, with its gallery, will seat about 1,000 persons. The requirements of this chamber were unusual and difficult of definition. It had to be arranged primarily for the general meetings of the societies, at which the speaking is from the floor as well as from the platform, and at which diagrams, illustrations or blackboard drawings are often employed. This is quite the opposite from the ordinary audience-hall, where the stage is the starting point both for the seating arrangements and for the acoustic and optical necessities. Hence the platform is notably small for so large a hall, accommodating few persons, while any speaker in the audience is easily within range of observation by everybody.

On both the parterre and the gallery floors, at the sides, the auditorium is surrounded by corridors, rendering access to every point very easy, and permitting ready withdrawal for conversation, committees, etc. The corridors assist also in maintaining quiet within the hall. The platform has ante-rooms and is conveniently close to the freight elevator, for delivery of apparatus. There is also a fine stereopticon equipped with connections for moving pictures. The seats are fixed opera-chairs in red leather with revolvable tops, and the aisles are laid with red carpet. The gallery front is bordered in red plush. Above the auditorium arch is a decorative cartouche bearing the badges of the three founder societies. There are side brackets for lighting, but the main illumination is effected indirectly through the glass ceiling, above which are incandescent lamps. The elevators and stairs open directly upon the two floors of the auditorium which can thus be emptied very quickly in case of emergency. Practical tests of the chamber have already shown it to be a success in every respect of comfort and convenience.

The next two floors above the main auditorium are devoted entirely to lecture-rooms, of which there are no fewer than seven. Two spacious assembly-rooms, 51 feet by 66 feet and 29 feet by 66 feet, occupy the larger part of the fifth floor in such a manner that they can be used independently, or one may be made auxiliary to the other. Two smaller rooms on this floor, 16 feet by 22 feet and 18 feet by 19 feet, can be also used separately or as annexes for reception or conversazione purposes, and provision is made with steam-tables, etc., for the service necessary for luncheons or light refreshments. All these rooms are agreeably finished in soft light tints and have facilities for water, air, electric connections, etc., for demonstrations and experiments.

The sixth floor is also divided into lecture-rooms, planned somewhat differently, and of smaller dimension than those on the floor below. The dimensions are respectively 22 feet by 44 feet 6 inches, 30 feet by 46 feet 6 inches; 30 feet by 41 feet and 20 feet by 28 feet. In this manner the building affords facilities to audiences of every size, from 1,000 down to 100; while on occasion every room can be occupied by sections and sub-divisions of an engineering or scientific meeting, with independence and without interference.

The seventh and eight floors have been reserved for the associate societies that have engineering or some department of science as their principal object. For these organizations the building affords office areas of varying size, from one room up, with the common facilities of the lecture-rooms, library and other accessories. Among these societies may be enumerated the Society of Naval Architects and Marine Engineers, the Society of Heating and Ventilating Engineers, the National Electric Light Association, the Society of Chemical Engineers, the New York Electrical Society, the Association of Edison Illuminating Companies, the American Street and Interurban Railway Association.

Each of the three Founder Societies occupies a floor laid out in accordance with its own plans. The American Institute of Mining Engineers has the ninth floor, the American Institute of Electrical Engineers has the tenth floor, and the American Society of Mechanical Engineers has the eleventh floor. These floors are all devoted to administrative and executive work, and the libraries of the three societies have been concentrated in the two top floors of the building.

A crowning detail in the plan has been the reservation of the twelfth and thirteenth floors for the libraries of the three Founder Societies and of such other collections of engineering literature as may be added. The twelfth floor, below the library proper, has been devoted to the book-stacks, but at the present time the main library is also equipped with one tier of stacks, with provision for a gallery tier later. The stack-room is partly equipped with stacks, and in the library a delivery-desk, reading tables and chairs have been provided. The Founder Societies entertain the ambition of creating and maintaining the finest collection of engineering literature in the world, supplemented by the current periodicals, and all the patents relating to invention in the arts and sciences. Provision is being made for special research accommodation, working alcoves, photographic reproduction, drawing and similar library work. Commanding magnificent views of Greater New York and vicinity in every direction, the library is retired, quiet, free from noise and dust, an ideal haunt of the student and man of research; while open at all times to any reader. In view of the proximity of the new Public Library, the Engineering Societies Building, with its unequaled collection of scientific and industrial data, becomes at once a vital and important center of the highest value for the diffusion of useful knowledge, and the two libraries supplement each other.

A bronze bust of Mr. Carnegie, executed especially for the building by Mrs. E. Cadwalader Guild, a well-known sculptor, from sittings, and presented by the present and past officers of the Founder Societies, stands at the eastern end of the library, facing toward the main entrance from the elevators.

A FINAL REPORT ON THE SAN FRANCISCO DISASTER.—I.

IN the *Proceedings* of the American Society of Civil Engineers for March, that makes its appearance nearly twelve months after the occurrence of the San Francisco disaster, may be found the reports of a general committee and six special committees appointed to investigate and report on various phases of the disaster. Considering the authoritative source from which they emanate and the deliberateness with which they have been prepared, these reports doubtless deserve to be considered the final word on the lessons derivable from the lamentable mishap. Therefore we reproduce in full that one of the special reports which is of most value to architects and builders:

THE earthquake in the western portion of California, and the resulting fires in San Francisco and Santa Rosa on April 18, 1906, caused a general destruction of engineering structures which is of interest to many engineers.

It may be stated that this report has been delayed in order that as complete data as possible might be obtained. The damage by fire and earthquake was extensive; and, in the case of fire damage, the effect on concealed parts was hidden, and could only be ascertained when the buildings were stripped. This can hardly be said to be complete as yet, but it was felt that the report could not be delayed any longer for that reason.

Some members of the committee have been employed in a professional capacity in the examination of damaged buildings. These statements, when considered in connection with the press of business in an extraordinary period, must be taken as the excuse for not furnishing to the profession an earlier report.

The region affected by the destructive effects of the shock was some 300 miles long by 50 miles broad, and covered the most populous part of the State, including the cities of Santa Cruz, San José, Alameda, Oakland, Berkeley, San Francisco, Napa and Santa Rosa, besides a number of smaller towns. No attempt is made here to enter into a detailed study of the shock, or its cause, such topics being treated by the Committee on Geology.

The shock was followed by destructive fires in San Francisco and Santa Rosa, which destroyed the entire business districts of both places. The area burned over in San Francisco slightly exceeded four square miles. Santa Rosa had a population of about 8,000, and its entire business district was burned. A number of institutions, such as Stanford University at Palo Alto, the State Hospital for the Insane at Agnews, and St. Patrick's Academy at Menlo Park, were badly wrecked.

No statistics are at hand as to the number of people killed, but it might reach 750. At Agnews' Asylum 112 people were killed, of whom more than 100 were patients.

It is not believed possible to locate any particular place as the center of disturbance, the effects being about the same in all parts of the area named. The character of the ground had considerable to do with the destructive effects, buildings on rocky hills suffering much less than those on alluvial plains.

Any consideration of the damage to buildings must be preceded by a description of the type of buildings; hence this report is naturally divided into three parts, namely:

I.—Description of Buildings.
II.—The Earthquake Damage.
III.—The Fire Damage.

I.—DESCRIPTION OF BUILDINGS.

For the purposes of this report, buildings are divided into five types, as follows:

Type 1.—Wood frame structures.

Type 2.—Structures with brick, stone or concrete-block walls and timber floors and partitions.

Type 3.—Structures with brick and stone bearing walls, metal interior frames, and fire-proof floors.

Type 4.—Structures with steel frames supporting all wall and floor loads.

Type 5.—Reinforced concrete structures.

It must be recognized, of course, that there were various combinations of these types, but the classification is sufficiently definite for present purposes. Types 3 and 4 are nearly the same, but both fire and earthquake damage differed considerably in the two.

Building methods were about the same as in other parts of the United States, and hence a brief description is deemed sufficient. It must also be recognized that here, as elsewhere, there was much difference in structures placed under the same heading, the well-braced steel-frame building standing next to one without any attempt to supply bracing of any kind. For obvious reasons, no special building can be designated as being thus defective.

Type 1.—Wood Frame Structures.—With a few exceptions, all residences, including 2-story and 3-story flats, in the territory named, were of timber. The San Francisco ordinance allowed them to be built 45 feet high. Some higher buildings existed in San Francisco, but no data are at hand regarding earthquake damage, as they were burned. The construction was generally with studding one story in height, the succeeding story studding resting upon the floor joists. Some balloon framing was used, but it was not general. This type included residences, and, in some small towns and outside the fire limits in the larger towns, many store buildings were built in this way.

Type 2.—Masonry Walls, Timber Floors and Partitions.—This type of structure formed the more pretentious buildings of the cities and towns outside of San Francisco, and also the buildings at Stanford University, Agnews' Asylum, St. Patrick's Academy, and County Court Houses. In San Francisco, the great majority of business blocks were of this type, as were also the large private hotels and apartment-houses. Under the San Francisco building ordinance, they could be built 100 feet high, or 8 stories. Buildings of 2 or 3 stories might have, with the brick walls, a system of timber columns and girders, or a partition of timber studding, carrying the floors and roof. In higher buildings, cast-iron or steel columns and steel girders were used to support the joists. Roofs were of timber framing, covered with tin, or tar and gravel.

The Stanford University buildings had walls of brick with a facing of sandstone, one general type ruling throughout. Some of the older buildings had full stone walls, and these were but slightly injured. They were built by various architects. In some, wooden roofs without trusses were used; in others, steel or wooden trusses; and this feature had a marked effect in determining the amount of damage.

The Palace Hotel, an 8-story structure, occupying a large lot, was of this type, honeycombed with interior partitions of solid brick walls, tied together with numerous iron anchors. This building withstood the shock well, but a similarly constructed building at Agnews' Asylum was completely wrecked. Buildings with hollow-block walls were few in number; one of 4 stories in Oakland, one at San José, and four of 2 stories at Palo Alto, are all that have been noted, although others may exist.

Type 3.—Masonry Walls, Metal Interior Frames, and Fire-Proof Floors.—A list of the buildings of this type in San Francisco, with details of construction, is given in Table 1.

Outside of San Francisco, this type was not used, except for some County court-houses. The older fireproof buildings were

TABLE I.—BUILDINGS OF TYPE 3 IN SAN FRANCISCO

Name of Building	Stories	Approximate Area	Use	Front Walls		Columns	Floors	Ceilings	Column Protection	Partitions
				Lower	Upper					
Academy of Sciences	6	7,500	Museum, Offices	G.	S. S.	Cast-Iron	Concrete	None	Metal Lath	Metal Lath.
California Casket	7	10,700	Under construction	S. S.	S. S.	Channels	Concrete	None	Concrete.	None.
City Hall				B.	B.		Misc.	Misc.		
Crocker	11	10,000	Offices	G.	B. & T. C.	Phœnix	Tile	Tile	T. C.	T. C.
Crocker Estate	5		Lofts	T. C.	B. & T. C.	Cast-Iron	Concrete	None	None	None.
Emporium	6		Store, Offices	S. S.	S. S.	Z-Bars	Tile	Tile	T. C.	T. C. and Plaster Bl.
Ferry Building	3	112,000		S. S.	S. S.	Cast-Iron	Concrete	None	None	B.
Hall of Justice	5		Offices	S. S.	B.	Pl. and Angles.	Concrete	Metal Lath	Metal Lath	Metal Lath.
Hibernia Bank	2	17,000		G.	G.		Concrete	Metal Lath		
Kamm	7	9,000	Lofts	S. S.	S. S.	Channels	Concrete	None	Metal Lath	Metal Lath.
Majestic Theatre				B.	B.		Tile	Metal Lath		
Mercantile Trust	3	5,500		G.	G.		Concrete	Metal Lath		
Mills	11	21,000	Offices	M.	B. & T. C.	Z-Bars	Tile	Tile	T. C.	T. C.
Mutual Life	9	5,000	Offices	G.	B. & T. C.	Z-Bars	Tile	Tile	T. C.	T. C.
Old Chronicle	9		Offices	S. S.	B.	Cast-Iron	Tile	Tile	T. C.	T. C.
Post Office	3	68,000		G.	G.	Channels	Concrete	Metal Lath		
Scott	6	20,000	Lofts	S. S.	S. S.	Cast-Iron	Concrete	None	None	None.
Sloan	6			T. C.	B. & T. C.	Cast-Iron	Concrete	None	Metal Lath	None.
Spring Valley	6	10,000	Offices	G.	B. & T. C.	Z-Bars	Tile	Tile	T. C.	T. C.
Union Trust	9	8,400	Offices	G.	B. & T. C.	Channel	Tile	Tile	T. C.	T. C.
Wells Fargo	6	19,000	Offices	G.	B.	Cast-Iron	Concrete	Metal Lath	Double M. L.	Metal Lath.
Young	6	3,000	Lofts	G.	B.	Z-Bars	Concrete	None	Metal Lath	None.

Abbreviations: S. S., Sandstone; G., Granite; T. C., Terra Cotta; B., Brick; M., Marble.

of this type. Generally, the walls were self-supporting only, columns carrying all floor loads. This applies to buildings of 8, 9 and 10 stories. In buildings of less height, generally, the floor load next to the wall was carried by the wall. Data of the construction are given in Table 1. Very little attempt at bracing was used in this type, the Crocker Building offering the only instance of systematic design, and that not being very effective. All had fire-proof floors and partitions.

TABLE II—BUILDINGS OF TYPE 4 IN SAN FRANCISCO

Name of Building	Stories	Approximate Area	Use	Front Walls Lower	Front Walls Upper	Columns	Floors	Ceilings	Column Protection	Partitions
Alexander Hotel	11	4,700	Hotel	S. S.	S. S.	Channels	Concrete	Metal Lath	Metal Lath	Metal Lath.
Alto	8	1,500	Offices	B.	B.	Channels	Concrete	Metal Lath	Metal Lath	Metal Lath.
Aronson	10	9,350	Lofts	S. S.	B. & T. C.	Channels	Concrete	None	T. C.	T. C.
Atlas	10	2,700	Offices	B.	B.	Channels	Concrete	Metal Lath	Metal Lath	Metal Lath.
Bullock and Jones	8	4,000	Lofts	T. C.	T. C.	Channels	Concrete	None	T. C.	Metal Lath.
Claus Spreckels	19	5,600	Offices	S. S.	S. S.	Z-Bars	Concrete	Metal Lath	T. C.	T. C.
Fairmount Hotel	6	66,000	Under construction	G.	T. C.	Channel	Concrete	Metal Lath	Metal Lath	Metal Lath.
Grant	8	5,500	Offices	T. C.	T. C.	Channel	Concrete	Metal Lath	T. C	T. C.
Hamilton Hotel	12	3,100	Hotel	S. S.	S. S.	Channel	Concrete	Metal Lath	Metal Lath	Metal Lath.
James Flood	11	40,000	Offices	S. S.	S. S.	Z-Bars	Tile	Metal Lath	B. & T. C.	T. C.
Kohl	11	9,000	Offices	S. S.	S. S.	Channels	Concrete	Metal Lath	Metal Lath	Metal Lath.
Marston	8	1,200	Under construction	B. & T. C.	B. & T. C.	Channels	Concrete	...	Concrete	
Merchants Exchange	14	25,000	Offices	G.	B.	Pl. and Angles	Concrete	Metal Lath	Metal Lath	Metal Lath.
Monadnock	10	18,000	Offices	B.	B.	Channels	Concrete	Metal Lath	Metal Lath	Metal Lath.
Mutual Savings Bank	12	5,000	Offices	S. S.	S. S.	Z-Bars	Concrete	Metal Lath	Metal Lath	Metal Lath.
New Chronicle	16	5,600	Under construction	B.	B.	Pl. and Angles	Tile	Tile	T. C.	T. C.
Rialto	9	16,000	Offices	T. C.	B. & T. C.	Channels	Concrete	Metal Lath	Metal Lath	T. C.
Ruef	8	1,000	Under construction	...	...	Channels	Concrete	...	...	
Shreve	11	9,000	Offices	S. S.	S. S.	Z-Bars	Concrete	Metal Lath.	Concrete and T. C.	T. C.
St. Francis Hotel	1	22,000	Hotel	S. S.	S. S.	Z-Bars	Concrete	Metal Lath.	Concrete and T. C.	T. C.
Telephone Co	8	2,500	Offices	B.	B.	Channels	Concrete	Metal Lath.	Metal Lath	Metal Lath.

Abbreviations: S. S., Sandstone; G., Granite; T. C., Terra Cotta; B., Brick; M., Marble.

Type 4.—Structures with a Steel Frame Supporting all Wall and Floor Loads.—A list of these structures in San Francisco, with details of construction, is given in Table 2. Outside of San Francisco, there were but few, one in Berkeley, of 7 stories; two in Oakland, the highest having 11 stories; one in San José under construction (steel frame up); and the Spreckels Sugar Refinery near Salinas, of 5 stories. All were built with fire-proof floors and brick walls, with brick, stone, or terra-cotta fronts. The frame was of steel in all cases noted.

Type 5.—Reinforced Concrete Structures.—Only a few structures of this type existed in the territory affected, and these were built a number of years ago. The old portion of the Museum, and Roble Hall, at Stanford University, were built after the Ransome system, but little reinforcement was used in the walls. In Alameda there was a 4-story factory building built on the same system. At Redwood City there was a small 2-story sub-station, and in San Francisco a building was in course of construction with reinforced concrete columns and floors, but with brick walls. The Academy of Sciences had a complete reinforced concrete floor system on cast-iron columns. There was a 1-story factory in Berkeley, and a 3-story factory near Vallejo; also, two residences in country towns. As far as known, these nine instances are all there were in the earthquake region.

II.—The Earthquake Damage.

It is probable that the subject of earthquake damage will be of less interest than that of the fire damage. While considerable that has been learned can only be applied in earthquake centers, still there are many interesting points applicable to other regions. Again, while it is admitted that the Pacific coast of the American continent is subject to earthquakes, they are by no means limited to that region. The Charleston earthquake or the one early in the last century in the Mississippi Valley, while not as severe as that in California, might have been sufficient to destroy water supplies and start fires in any large city, the effect of which might have been as destructive as at San Francisco or as at Valparaiso.

Authorities are agreed that ground vibrated by an earthquake has both a vertical and horizontal motion. The amount has been stated as 1 inch and 3 inches, respectively, in the shock under consideration. The amount of motion undoubtedly varies, depending upon the character of the ground. Filled lands and alluvial plains undoubtedly have more motion than rocky hills. By these two motions and their combinations, a building may be damaged in two ways. If large in plan, one portion may be lifted and dropped before the remaining part moves, thus distorting the frame. In either case, a swaying motion is set up, the effect of which is more or less destructive, depending upon the elasticity of the structure, the same stresses occurring as when a live load passes over a truss.

The damage to buildings by the earthquake can now be taken up by considering each type as designated in Part I.

Type 1—Wood Frame Structures.—The principal damage to buildings of this type was the cracking of plaster and the wrecking of brick chimneys, which occurred everywhere. Numbers of houses were distorted and damaged, by the movement of filled ground upon which they stood, enough to compel their being taken down. This ground vibrated much more than other kinds, and resulted in upsetting houses. Numbers of houses with rotten foundations were upset, and in some cases 3-story structures lurched forward, breaking at the second-floor level and collapsing the first story.

Speaking generally, there was little damage to wooden frame buildings. Undoubtedly, they should be well braced, and the foundation should be carried below the soil to a firm material. Mention might be made of the precaution that pictures and other ornaments in sleeping apartments should not be placed so that in falling they may injure the sleepers. The greatest source of danger lies in brick chimneys. Innumerable instances occurred where the chimney broke through the roof. It may seem paradoxical to say that if brick chimneys must be used, they should be built with poor mortar above the roof line, but the reason is that, if so built, they will be shattered and will fall in parts. If well built, and falling as a whole, the effect is much more destructive. It is idle to expect the exposed portion of a chimney of ordinary dimensions, even of brick and Portland cement, to stand, when vibrating with a house during an earthquake. Some statements are added in the general conclusions following.

Type 2.—Masonry Walls and Timber Interior.—Buildings of this type suffered most from the shock, and in them the greatest loss of life occurred. The damage ranged from minor cracks in brickwork to the complete destruction of large buildings. The swaying motion produced by the earthquake caused diagonal cracking in all directions. In all structures with brick, coursed-stone, or concrete-block walls, these diagonal cracks appeared, crossing each other and generally running at about 45 degrees with the horizontal. Piers between windows, spandrels between window heads and sills, and interior partitions were thus affected. Stone mullions, sills, and transoms were cracked, and large sandstone and granite blocks were split.

Another feature was the shearing of brick walls near the ground. Walls of any length would be sheared from a just-to-be-seen crack up to an amount that upset the entire wall by removing the support.

Gables were upset everywhere. As built, there was little if any connection between the wooden roof and the brick. As the wall was thin, it resulted in upsetting the gable. The most marked instance of this was the gable wall of the Memorial Church at Stanford University, which stood, practically disconnected from

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the wooden roof. It was ornamented with a costly mosaic, and the entire wall fell.

Buildings of this type also suffered by the wrecking of fire-walls and cornices, which, falling in or out, did much damage. Some fire-walls, falling on lower buildings, wrecked them. People were killed in the street by cornices and upper walls falling outward.

A favorite method of constructing such buildings, when used as stores, was to build the front wall upon a girder, placed at the second-floor level, and supported on columns. As the interior frame was generally independent of this girder and the wall, the result was that the wall fell outward.

Another cause of the destruction or partial wrecking of such buildings was the roof construction. Cases were observed where roofs, of as much as 80 foot span, were built with inclined rafters resting upon the walls and unprovided with horizontal ties of any kind. When the building was in motion, the inclined rafters acted as thrust pieces to overturn the walls.

The foundations of such buildings were generally found intact, the damage increasing toward the top. Many arches were opened at the crown, and the arch stones or bricks dropped.

It must be recognized that buildings of this type were general throughout the region of the shock. The damage ranged from slight cracks to the complete destruction of large structures, hence no general statement covers the case. A few individual statements may be of interest. In Oakland, a concrete-block building, 4 stories high, was injured little if any. At Palo Alto, two such structures, 2 stories high, probably not very well built, were completely wrecked, the blocks being broken and disintegrated.

At the Agnews' State Asylum, large 4-story structures were completely wrecked. The walls stand, but are shattered everywhere. At this place, all partition and hall walls were brick, the buildings being a series of cells. It is difficult to describe the destruction of this brickwork. Probably 90 per cent. of the mortar bonds were broken, leaving the wall but a pile of loose bricks. The mortar was of fair grade. A large tower of brick over one building fell, doing much damage. At San José, the large City-hall, of brick, with brick partition and hall walls, was shattered everywhere. The old County Court-house was not badly hurt, but two later buildings were badly shattered.

At Stanford University, the uniform method of construction was brick walls, with a veneer of coursed ashlar. The buildings were connected by numerous arcades formed with two rows of arches covered by a hip roof. The arches rested upon single stone columns. Several buildings here were completely destroyed, notably the large library, gymnasium and museum buildings. The arches were injured by the dropping of keystones, the movement of supporting columns and the falling of spandrels. In many of the walls there was a separation of the ashlar facing from the brick backing. The cracking of walls, with other damage as noted above, was evident everywhere. Foundations were nowhere injured.

At St. Patrick's Academy, at Menlo Park, some large 4-story brick buildings were damaged, the worst effect being in the two upper stories. Two-story structures were but little injured. A tall tower on one building was badly wrecked.

At Santa Rosa, nearly every brick building was wrecked, and the resulting fire destroyed the entire business part of the town.

In San Francisco, while there are some special instances of buildings of this class withstanding the shock, there are others where there was complete destruction. The Palace Hotel is a notable instance of how a brick building may withstand the earthquake, it being practically uninjured.

Type 3.—Masonry Bearing Walls, Metal Interior Frames and Fireproof Floors and Partitions.—It may be questioned why this type was separated from Type 4, with a steel frame carrying all loads. The reason is that buildings of this type were damaged more by earthquake and fire than those of Type 4. In Table 1, showing the buildings of this type, no distinction is made between walls carrying some of the floor loads and those where all floor loads were carried on a steel frame—columns being placed in the walls. Of the latter class, the Mills, Crocker, Kamm, Union Trust and Mutual Life Buildings are examples. The frame of the Mills Building (1891) has columns of one-story section, each section resting upon the cap of the one below, and connected thereto with four bolts. Beams and girders rest upon the cap plate, and the entire structure was bolted above the third floor. After the earthquake and fire, this building leaned from 7 to 9 inches out into Bush Street. The distortion of the frame was uniform above the second floor. There being no crack in the outer walls, it is difficult to say whether this movement was due to the shock, or had been a gradual movement from the time of construction. As all buildings of this type were burned, it is difficult to separate earthquake from fire damage.

In the Kamm Building, one wall, seven stories high—60 feet, of 13-inch wall and the remainder 17-inch—sprang out about 14 inches near the middle height. The reason is obscure, some stating that it was caused by the explosion of dynamite. In other respects, the outer walls of buildings of this type suffered as other brick walls. Interior partitions of terra-cotta show all the characteristic cracks of brick walls, the mortar joints being broken and opened from ¼ inch to 2 inches. Cornices, being generally supported on iron brackets, held, but here, also, it is difficult to separate fire from earthquake damage. Speaking generally, those buildings with a steel wall column supporting the floors suffered less than those where the walls held the floors.

Type 4.—Structures with a Steel Frame Supporting all Wall and Floor Loads.—Relatively buildings of this type were those most exposed to earthquake damage, the type including most of the tall buildings in the city. Here, as elsewhere, it was a question of bracing. Some frames were well braced, others partially so, others not at all. The Claus Spreckels Building (nineteen stories), about 80 feet square in plan, was braced better than any. Portal bracing was placed on each side of each corner, up to the third floor. In addition, there were eight lines of eye-bar diagonals from the basement to the fourteenth floor and three above. All girders had gusset-plate knee-braces. The Mutual Savings Bank Building (twelve stories) had two lines of portals and two lines of eye-bar diagonals from top to bottom. The New Chronicle (sixteen stories) had deep girders and gusset-plate knee-braces throughout. The Shreve Building (eleven stories) had deep girders and two complete systems of portal bracing. The Kohl Building had deep lattice girders throughout. The Merchant's Exchange, St. Francis Hotel, Fairmount Hotel, Monadnock, Rialto, and James Flood Buildings were large in area, and were without special wind bracing.

Earthquake damage consisted in cracks in partitions, where made of tile. On the buildings where corner piers of stone rested upon concrete under the sidewalk, the stonework was badly cracked. Where such stone was carried on the steel frame, no cracks are found, but there are only a few instances of this method. Walls of brick, or of stone and brick, did not suffer as much as might have been expected. The rear walls of the St. Francis Hotel were cracked. The walls of the Atlas Building were affected in the same manner. The rear brick walls of the Merchants' Exchange moved outward on the girders from 1 to 3 inches. On the Spreckels Sugar Refinery, near Watsonville, there were several cases of the 13-inch brick walls being thrown down, but no such damage occurred in San Francisco. A number of piers and spandrels of the brick front of the new Chronicle Building were cracked, as were also the terra-cotta faces of the Fairmount. The brick front of the Monadnock was badly cracked. On the Claus Spreckels Building, the sandstone fronts were intact up to the tenth story. From there to the sixteenth story, the stonework was badly worked on the beds. Some stones were split, and nearly every one moved, the maximum movement being possibly 2 inches. This stonework rested on girders, and was backed with brick. The dome of the building containing the seventeenth, eighteenth and nineteenth floors, was covered with terra-cotta, each piece being anchored to the metal frame. As far as could be determined, no damage or movement of this terra-cotta took place. The same is true of the terra-cotta gables of the Mutual Savings Bank. As far as observed, the damage to stone facing was greatest on the Claus Spreckels Building.

To this statement of damage to stonework, exception must be taken in the case of stone cornices. Elaborate cornices of sandstone were used on the Claus Spreckels, Mutual Savings Bank, Kohl and James Flood Buildings, all supported on iron brackets, and no movement or breaking of stone could be observed. The same is true of terra-cotta cornices on other buildings; in fact, the care taken to support cornices seemed to protect them from damage.

No foundation damage was observed in any buildings.

The damage to steel frames was almost negligible. Some rivets were sheared in the James Flood Building, and in the Union Trust Building a number of bolts were sheared. As most

of the frames are hidden, the extent of the damage is unknown, but is probably small. A few of the eye-bars of the diagonal bracing of the Claus Spreckels Building were bent, as if the opposite ones had taken the strain. A careful examination failed to reveal any sheared rivets. The greatest damage to a steel frame was that of the tower of the Ferry Depot. This tower was about 40 feet square and some 200 feet high above the main structure. It was sheathed with brick and stone, except the top, which was of metal. The frame had a column at each corner, with a complete system of diagonal rods. A number of rods were broken, and in places the gusset-plates were torn and the rivets sheared. This building rests upon piles driven into deep mud, and it was probably badly shaken.

Type 5.—Reinforced-Concrete Structures.—Only a few instances of this type exist. The old portion of the Stanford University Museum, a complete structure, was uninjured, except for a few cracks. The connecting brick portion was badly shattered. Roble Hall, at the same place, a three-story and attic structure, was uninjured, except where some brick chimneys fell, breaking the roof and floors. The sub-station at Redwood City was injured, and a part had to be rebuilt. This structure was built on marshy ground near the bay, and was exposed to the worst effects of the shock. A warehouse in San Francisco, in course of construction, with two stories up, had its brick walls wrecked, but the reinforced-concrete frame and floors were uninjured, except by the fall of the walls. The floors of the Academy of Sciences and of the Folger Building were uninjured by the shock, and the same is true of the complete reinforced-concrete building, three stories high, in Alameda. The factory buildings and residences before mentioned were uninjured. These constitute the only examples of this type known to the writers, but all the evidence points to the superiority of this method of construction.

Conclusions.—The writers offer the following as conclusions based upon a study of the effects of the earthquake. These conclusions are offered for the reason that it is recognized to be impossible to set forth in a partial description a full idea of the damage.

The effect of the earth motion is to set a building in motion. The structure is thus subjected to all the stresses occurring in a truss sustaining a live load. The amounts of the stresses are unknown, and cannot be predicted, as the intensity of the shock is unknown. Obviously, the shock may range from a tremor to that of a violence that would wreck any building. Again, should the earth-slip take place beneath a building, it would be wrecked.

(*To be continued.*)

ILLUSTRATIONS

THE ENGINEERING SOCIETIES' BUILDING, WEST THIRTY-NINTH STREET, NEW YORK, N. Y. MESSRS. HALE & ROGERS AND H. G. MORSE, ASSOCIATED ARCHITECTS, NEW YORK, N. Y.: FOUR PLATES.

For description, see article elsewhere in this issue.

HOUSE AND STABLE OF W. S. PATTEN, ESQ., SOUTH NATICK, MASS. MESSRS. WHEELWRIGHT & HAVEN, ARCHITECTS, BOSTON, MASS.: TWO PLATES.

COMPETITIVE DESIGN FOR HOTEL, FOURTEENTH STREET AND PENNSYLVANIA AVENUE, WASHINGTON, D. C. MESSRS. C. F. GARLICHS AND JAMES E. WARE & SONS, ASSOCIATED ARCHITECTS, NEW YORK, N. Y.

This design can hardly have failed to satisfy the projectors of this enterprise through any defects and deficiencies in the arrangement of the rooms, as we have rarely seen a plan conceived and carried out with greater simplicity and elegance.

Additional Illustrations in the International Edition.

MAIN ENTRANCE: ENGINEERING SOCIETIES' BUILDING, WEST THIRTY-NINTH STREET, NEW YORK, N. Y.

HOUSE OF THE CHANCELLOR OF THE CATHEDRAL OF ALL SAINTS, ALBANY, N. Y. MR. MARCUS T. REYNOLDS, ARCHITECT, ALBANY, N. Y.

NOTES AND CLIPPINGS

TRADE UNION STRENGTH IN NEW YORK STATE.—According to a current report of the State Department of Labor, there are only four counties in the State which have no labor organizations. These counties are Hamilton, Lewis, Schoharie and Schuyler. About two-thirds of all trades unionists are in the four counties which constitute the city of New York (260,008 members of 678 organizations). Of the 398,494 union men and women in the State, more than 90 per cent. are in the cities, the number having increased in the past decade from 170,215 to 372,093.

RESURRECTION OF A STATUE OF VICTORY.—A strange resurrection of a statue has recently taken place in France. It was found in the cellar of the Senate buildings, where it had lain since 1870. Early in that year, when everything looked peaceful in France, Napoleon III. ordered the famous sculptor Gustave Adolph Desiré Crauk to model a statue of the Goddess of Victory to be cast in bronze for the Luxembourg Gardens, where several other statues by Crauk are displayed. By a strange fatality the sculptor shipped the completed work from his studio in Valenciennes just in time for it to be delivered in Paris on September 2, the day of the capitulation of the First French Army with Napoleon himself at Sedan. The Goddess of Victory had not many worshippers in Paris at that time. The statue was never even unboxed. It was shoved out of sight and promptly forgotten. Lately Senator Girard, who hails from Valenciennes, got some hint of the existence of the work and started a search for it, as there is talk of holding an exhibition of Crauk's works in Paris at an early day. The statue was found and the critics pronounce it a work of merit. The superstitious see in its discovery an omen of returning military prestige to France. Senator Girard at once laid claim to the statue for the sculptor's native city. Nobody wanted to carry out the project of Napoleon, so he carried his point. The statue has been erected in Valenciennes and unveiled with elaborate ceremonies after its thirty-six-year sleep in dust and darknss.—*New York Sun.*

METRIC SYSTEM REJECTED IN GREAT BRITAIN.—The House of Commons on March 22 by 150 to 110 votes rejected the bill purposing to introduce the metric system into Great Britain. Mr. Lloyd-George, president of the Board of Trade, in behalf of the Government, said the adoption of the system would be a dangerous and costly experiment by which Great Britain would lose the advantage which she now possesses in foreign markets over her metric-system competitors.

COLOR-BLIND ARTISTS.—Artists are as subject to color-blindness as other men. The writer has tested the color sense of a large number of them—colorists, engravers, illustrators—and found an average of one in twenty-two color-blind. As a class they are quicker to recognize varying shades, but a green-blind artist will place a brown skein of worsted with the green as readily as a layman. The possession of an "artistic temperament" bears no other relation to the keenness of one's color sense than comes from close observation and use of color. If an artist's eyes at birth do not possess all color-seeing cones in his retina, he cannot develop them by cultivation.—*Century.*

ANTONIO ZUCCHI, CASTLE-BUILDER.—That the power of utilizing opportunities which characterized the architects of Tivoli continued to exist among the Italian architects in the eighteenth century is suggested by the practice of Antonio Zucchi. He was closely connected with the Brothers Adam, and if he did not design at least decorated several of their buildings in England. In 1770 he was elected an Associate of the Royal Academy. He was also the second husband of Angelica Kauffmann, R.A. He is supposed to have been only a painter, but in Italy he was better known as an architect. An Englishman who was acquainted with him gave the following account of his practice: "He was a great castle maker, and his mode of composing them was to draw first a bold and varied outline of the rock, mountain or eminence upon which his castle was to stand. He then, with according lines, added his castle; and you would be surprised to find how the imagination is assisted by this practice, and what towers, battlements and projections are suggested by it which would not otherwise have been thought of. I always observed that his building was more varied and picturesque in exact proportion to the taste and happiness with which the foundation-line was struck."—*The Architect.*

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SOCIETIES, PERSONAL MENTION, ETC.

IT is the experience of those who have served as expert-advisers that the average building-committee is made up of sensible, well-intentioned men, distinctly amenable to guidance. The inference is, then, that building-committees which have not had the forethought to seek the counsel of an expert-adviser also consist of well-intentioned men, who mean, and are trying, to deal fairly. A large part of the "competition evil" would vanish if there could be devised some way of rounding-up and posting new building-committees before they had committed themselves, through uninstructed action, to unfair or, at least, impossible programme conditions. A case in point is afforded by the competition for the new quarters of the Lotos Club, New York. Here seventeen architects were invited to compete in a limited, but unpaid, competition, and on reading the programme thirteen of them united in declaring the conditions "unusual" and asked for a joint conference with the building-committee, in order that the terms might be reconsidered and restated. This the committee declined to do, arguing that, since three competitors had accepted the terms and were already at work, they were in honor bound to stand by the programme as issued. The committee's action was honorable, well-intentioned and not unreasonable; but it was none the less mistaken and unnecessary. The committee evidently felt that in assuring the job to the winner at the full five per cent. rate, or a reasonable prize to the best design in case no one won, and in making it plain that the competitive designs were to be fairly considered and adjudged without favor, they had done all that the accepted rules of practice demanded. To be sure, no promise was made that an expert-adviser would be called in, but, then, everyone could see for himself that one of the committeemen was a man whose judgment deserved consideration and respect.

BUT, lacking competent guidance, the committee did not comprehend that their problem had "unusual" conditions, and so demanded unusual treatment, or, rather, such treatment as is usually accorded to unusual conditions. Passing over the fact that, for a limited and unpaid competition, the number of invited competitors was unusually and needlessly large, we find that the problem to be solved consists in the transformation into a convenient and fireproof club-house of an apartment-house built some years ago; and, further, that it involves the transfer and reinstallation in the new building of certain portions of the present club-house situate in another part of the city. In other words, the problem is distinctly one of "alterations," and so does not fall under the five per cent. rule. At the conference suggested it would have been made clear at once that the competitors, having each to examine and measure, not one existing building, but two, would be put to greater expense than usual, and that this should be allowed for both in the compensation of the winner and in the amount and number of the prizes offered as consolation to the unsuccessful. It would have taken but a short argument to satisfy a committee such as the one in control that their problem was not yet in condition to submit to architects and that, in fairness, they should relieve the competitors of an unnecessary duplicating of expenses by themselves providing a certified description of the present buildings, properly dimensioned.

UNFORTUNATELY, as we believe they will agree, the committee was not caught in time, and that is usually the case with such bodies. It is a condition that perennially confronts the profession, the same that so troubled the notable Mrs. Glass, and it is high time that architects tried to do something effective to catch their hares. How to instruct the public and prevent these easily remediable blunderings is the real problem to be solved, and we think it can be partly solved if the several architectural organizations will open their eyes to the fact that advertising is one of the most potent weapons in the arsenal of commercial life, and hardly less so in all other fields where real progress is making. Without exception, we believe, the important daily papers maintain a real-estate and building-news department, which receives a considerable expansion in one issue for each week. It seems to us that an announcement always appearing at the head of such departments, to the effect that the local organization of architects stands ready to aid building-committees in preparing competition-programmes so that they will attract in place of repelling the desired competitors, should enable the catching in time of a good many lagomorphic committees.

TWO matters of extreme interest have been if not developed yet at least hinted at, in the matter of the Pennsylvania Capitol scandal since we last wrote. It will be recalled that the ladies of Harrisburg, some years

since, had to unite in public protest to prevent the destruction of the grove of fine trees in the Capitol grounds which Mr. Huston was desirous of removing *in toto* in order that he might have space enough for his "approaches." It is now said to be disclosed by the granite dealers who had figured on this proposed embellishment that, if these approaches and their allied walls, balustrades, etc., had been carried out as designed by Mr. Huston, the total cost of the Capitol, in place of being thirteen millions as now, would have been over thirty millions! The ladies have a right to be acclaimed real economists. The second matter is the interesting possibility that, at length, the history of the connection of Mr. Henry Ives Cobb with the building in all its particulars may be known. Mr. Cobb, it will be remembered, was the architect into whose hands, as the result of the early unpleasant competitions, was placed the task of producing for the appropriated $500,000 a "complete" and "fireproof" building in time for the ensuing legislative session. He actually produced a partially fireproof and very incomplete brick structure which his final drawings showed was intended to be but the central portion of a much larger and more elaborate building after being cla.' inside and out with marble. Just why Mr. Cobb was not allowed to carry out his ideas, while Mr. Huston was, it would be very interesting to know, and Mr. Cobb is desirous that it shall be known, for he is pressing to obtain leave to sue the State of Pennsylvania for an architect's commission on the building as it stands, alleging that Mr. Huston made use of the designs he left on file behind him. Further, it is alleged that a draughtsman has been found willing to testify that he was employed by Mr. Huston to copy the Cobb drawings, being kept *perdu* while doing so.

IT seems to us that Pennsylvania is hardly happy in inventing a new name for a very useful adjunct of municipal government which has long been known in other communities by another and better name. "Municipal Art Jury" seems less dignified than "Municipal Art Commission," and by the public it is likely to be thought of only as a body, in some way and at some time, concerned with the receiving and hanging of pictures. However, the power rather than the name of the body is the thing of real concern. This new jury, if the bill is passed, comes into being in cities of the first class—and as there is at the moment only one such city in the State, it concerns for the present Philadelphia alone—on the appointment by the Mayor of nine members, including himself. Among them are to be a painter, a sculptor, an architect, a member of the park commission and four others, selected from the governing and teaching forces of the schools of art or architecture in the city. These men are to serve without pay—and we hope that this sensible provision may never be varied from in any American community—and are to have cognizance of and control over the same matters and undertakings that fall under the consideration of similar bodies in other cities. We think that the public is coming to understand that a Municipal Art Commission is of quite as much importance to a city's real welfare as its school-committee.

THE smug and self-satisfied provincialism of New York has been shown in nothing more than in the way it has shut its eyes to the fact that as an advantageous centre for their exploitation, Philadelphia, Pittsburgh, Chicago and even Boston are of more value to American artists than is its metropolitan self. The artists themselves have not been blind to this, nor have they been voiceless sufferers, but as the problem is one which they cannot handle alone, one that they should not be expected to cope with unaided, they have been able to accomplish little. Feeling that at length enough missionary work may have been done, the Council of the National Academy of Design has just issued an appeal to the public for material aid toward the erection of an exhibition building which will allow the exhibitions of the National Academy to rank with those held in Philadelphia and Pittsburgh. As the interest of the public in the permanent collections at the Metropolitan Museum of Art manifestly grows with the expansion of those collections, the public doubtless will assent to the proposition that it has a very real concern in the character of the temporary exhibitions that the National Academy undertakes to provide, and so may be counted on as willing to aid any well-considered scheme that may be formulated.

THE death of Osborne Howes, of Brookline, Mass., last week, in his sixty-first year, puts an end to the career of a very active-minded and useful citizen, one to whose well-directed efforts the country at large and those interested in buildings in particular are under much the same sort of obligation as they owed to the late Edward Atkinson. After an early life of a rather adventurous type, Mr. Howes engaged in newspaper work in New York, and at the time of the great Boston fire he was, through his intimate knowledge of that city where he was born, able to expand for the New York *Times* into a most readable, full and generally accurate account of the progress of the fire the brief and disjointed messages that trickled over the wires, thus enabling the *Times* to eclipse its metropolitan rivals. He was always particularly proud of this piece of work, and it seems not unlikely that the performance was the cause of his being asked to return to Boston the following year to become secretary to the Boston Board of Fire Underwriters, an office he held up to the time of his death, and through which, as Boston architects know, he was able to exert a very real influence on the building methods of the community. As editorial writer on the Boston *Globe*, and later on the Boston *Herald*, Mr. Howes was able to continue in the newspaper field up to the time of his death, and much of the sane and sound counselling contained in the latter journal has been due to his prompt and careful consideration. Politically a Mugwump and Free-trader, he was a member of many influential commercial bodies, and was frequently appointed by the State to a place on important commissions. His early life at sea made him always peculiarly interested in shipping matters, and caused him in 1891 to persuade the Legislature to establish the Nautical Training School, which is now maintained on the U. S. S. "*Enterprise*."

A FINAL REPORT ON THE SAN FRANCISCO DISASTER.[1]—II.

CONCLUSIONS AS TO EARTHQUAKE DAMAGE.

THE writers offer the following as conclusions based upon a study of the effects of the earthquake. These conclusions are offered for the reason that it is recognized to be impossible to set forth in a partial description a full idea of the damage.

The effect of the earth motion is to set a building in motion. The structure is thus subjected to all the stresses occurring in a truss sustaining a live load. The amounts of the stresses are unknown, and cannot be predicted, as the intensity of the shock is unknown. Obviously, the shock may range from a tremor to that of a violence that would wreck any building. Again, should the earth-slip take place beneath a building, it would be wrecked. Sufficient evidence is at hand to warrant the statement that a building designed with a proper system of bracing to withstand wind at a pressure of 30 pounds per square foot will resist safely the stresses caused by a shock of an intensity equal to that of the recent earthquake in California.

The prime requisite of the structure is elasticity. This must be understood as the ability of a structure to return to its original form after distortion. This elasticity allows the building to absorb the motion of the earth, where a more rigid structure would be ruptured.

To this requirement, the building with a timber or steel frame answers very well. The reinforced-concrete structure does so also, with the exceptions noted below. The building with stone, brick or block construction, having horizontal mortar-joints, does not answer the requirement at all. It may be stated, as one of the most obvious lessons of the earthquake, that brick walls, or walls of brick faced with stone, when without an interior frame of steel, are hopelessly inadequate. As a method of building in earthquake countries, such types are completely discredited.

To resist the shearing effect of the horizontal earth motion, vertical members are necessary. The shear is transformed into diagonal forces, which appear as stresses in diagonal and horizontal members. There was probably no better illustrated lesson of the existence of diagonal stresses than that offered by the innumerable instances of the cracking of brick and stone work along diagonal lines. In relation to this, it may be stated that a brick spandrel wall adds little, if any, to the bracing of a steel frame, Many of such walls were cracked badly, and moved on the supporting girder. No reliance should be placed upon them, as they are open to all the objections stated in connection with brick walls in general. The well-designed steel frame offers the best solution of the question of an earthquake-proof building, as all the stresses can be cared for. The well-designed timber-framed house is also adequate. A reinforced-concrete building offers a solution, but is open to the following objections:

Architectural reasons demand that diagonal bracing shall not be used except on rare occasions. This is overcome by the use of gusset-plate knee-braces and portal-braces in the steel frame. Such design induces severe bending moments in the columns and girders; and in the girders, the moment may be of the opposite character to that of the floor loads, thus producing tension in the upper flange of the girder. As at present designed, no reinforcement is used at that point, and hence such a girder would be defective. Again, it will be found upon analysis that relatively great stresses occur at points where the girders join the columns, especially in the lower floors of tall buildings. Here, again, the reinforced-concrete construction, as now designed, is weak. These remarks are offered more in connection with high buildings. They can be overcome by the designer in reinforced-concrete. All the evidence in the recent shock favors reinforced-concrete, but the writers are of the opinion that the steel frame offers the best solution of the problem.

Foundations did not suffer at all, no instances of any damage having come to hand. Some discussion has taken place as to the advisability of making a monolithic mass under buildings. Several of these have been constructed, such as the Claus Spreckels, Mutual Savings Bank, and Bullock and Jones Buildings. They are all of relatively small base. It is commercially impossible to construct a monolithic base under a building, say, twelve stories high, and having a base of 150 feet. Buildings of that size and larger, with isolated pier foundations, suffered no more than others. The evidence is that foundations well built, along accepted lines, are adequate. It might be claimed that, if such had been used in large structures, the damage would have been less. The evidence does not point that way, for even if the monolithic base were sufficiently strong to resist the vertical earth motion, the horizontal motion would still vibrate the structure.

Evidence for floors is not conclusive, as all terra-cotta-arch floors were afterward burned. Terra-cotta arches covered with concrete stood without much damage in the brick portion of the Stanford University Museum. The terra-cotta there could not be seen. Analogy with masonry walls would seem to say that many of the joints would be broken. Ordinary concrete floors stood the shock with but little damage.

In the case of partitions, those of terra-cotta tiling were everywhere cracked and opened. It amounted to practical destruction in most cases. In this case, earthquake damage can be distinguished from fire damage. Partitions of metal studs and lath suffered less, but plaster was badly cracked. Nothing seems to be suggested for a partition in which the plaster would not be destroyed.

For rear walls, reinforced concrete offers the best solution, the reinforcing members being tied to the steel frame. A facing of brick or stone could be backed with reinforced concrete. In the case of stone, the parts should be doweled together, and, if possible, all tied to the steel frame. Terra-cotta as a facing for walls is admirable, in this respect, as it offers superior facilities for tying it to the steel frame. For fire and parapet walls, the steel frame should be carried up, and anchors should be provided.

Brick chimneys, large and small, are open to all the objections of brick walls, only in a more marked degree, owing to their isolated design. Reinforced concrete seems to offer the best method for such construction.

Arches with voussoirs are not able to resist earthquakes. The motion opens the joints, and the keystones fall, thus thrusting aside the abutments. Evidences of this exist everywhere.

Finally, it may be questioned whether difference in workmanship was not responsible for many of the results. While it is true that good workmanship gave better results than ordinary, it is still the opinion of the writers that it was mainly a question of design. Agnews' Asylum was of brick, laid in a fair grade of lime mortar. Ten miles away, on similar ground, St. Patrick's Academy, of similar design, was of brick, laid in lime and Portland cement, and there was better work than at Agnews'. The damage at the latter place was less than at the former, but, as far as use was concerned, both places were demolished. The tower at St. Patrick's Academy was of brick, laid entirely in Portland cement mortar, and the work was so well done that the brickwork invariably broke through the bricks and not at the joints; yet the tower was completely destroyed; in fact, it was the worst wrecked of all the buildings there.

The writers simply reiterate the statement that, speaking generally, buildings of brick walls and wooden interiors cannot be built which will not be wrecked in a severe shock, it being a fault of design and not of materials or workmanship.

III.—THE FIRE DAMAGE.

Within half an hour after the earthquake shock, the Fire Department of San Francisco had notice of fifty-two different fires. It is probable that others had started. The fire lasted three days, being finally stopped by dynamite, wide streets, and individual efforts. The wharves of the city were saved by State and United States Navy tugs. Only a portion of the residence district was saved. Some isolated fires were extinguished by the Fire Department, using water in the dead ends of mains. The destruction of the supply mains, described in another report, was complete, and hence the entire fire burned without interference. The area destroyed was a trifle in excess of four square miles. It was entirely covered with buildings, excepting where there were lumber-yards. A few isolated blocks escaped, but they are of no interest in connection with this report.

In commenting upon the destruction by this fire, it must be borne in mind that no water was used on any of the materials. Hence, in some cases, the damage is less than it might have been had water reached the materials while they were hot.

Of the buildings within the burned area, estimated at nearly 20,000, only those given in Tables 1 and 2—some 50 or 60—remain standing. All others are completely destroyed, only some brick walls standing here and there. Unless one has been an eye-witness, it is difficult to realize how all materials that men make

[1] A report on the San Francisco disaster by the American Society of Civil Engineers, published in the "Proceedings" of that Society, and here continued from page 144, No. 1633.

into the shape of buildings can be so utterly destroyed in a general conflagration. With two exceptions—the Kohl and Atlas Buildings—all the buildings in Tables 1 and 2 were completely burned in the interior, only the frame remaining.

All the business center of the City of Santa Rosa was destroyed, but as only buildings of Type 2 were burned, nothing additional can be learned there, and no further mention will be made of this place.

It would be well to state here that when the phrase "complete destruction" is used, it means that the part is destroyed so that it is unfit for further use. Under this, a disintegrated terra-cotta floor, or a leaning brick wall, or a bent steel beam is "destroyed," even if the part may be again reshaped and used.

No attempt will be made here to describe in detail the amount of destruction of any one building. Cases will be cited illustrating various points. It is believed that a description of the fire effects on different materials and upon their combination will be of more real interest. Reference will only be made to buildings of Types 3 and 4. Types 1 and 2 were completely destroyed, and Type 5 had no example of moment. In Type 2, the city ordinance allowed buildings 100 feet high, if lathed with metal; and of 82 feet, if with wooden lath. No evidence is offered regarding this, as they were all destroyed.

Bearing in mind the definition of "complete destruction," it can be said that all materials were destroyed when directly exposed to the fire for any length of time. Brick, terra-cotta, granite, marble, sandstone, steel, cast-iron, concrete, plaster, cement, timber—all failed. Especial emphasis is placed on this point. Anyone with an interest in any one material can find evidence to support a claim for it; yet, impartial observation leads to the conclusion that, when a material was subjected to what would be considered a test fire, it was destroyed.

Front Walls.—All ordinary methods of construction were exposed to the fire. Granite suffered more than any other stone, spalling badly wherever exposed. Marble fared nearly as badly, and sandstone slightly less. With all, there was complete destruction. No limestone fronts had been used. Of the terra-cotta fronts, most were destroyed, for instance, the Bullock and Jones Buildings. Glazed terra-cotta blocks, used in court walls, were generally cracked. Terra-cotta brick spalled everywhere. The walls of the Mills and Merchants' Exchange Buildings are to be removed. Moulded terra-cotta brick and pressed brick withstood the fire best of all, but were spalled where much exposed. Terra-cotta brick with rounded corners fared best, sharp edges cracking off.

Either stone, brick or terra-cotta was used around windows, and here the damage was the worst. In relation to this, it may be said that terra-cotta is deceptive, in that it retains its form after being destroyed. Many fronts, apparently in good order, must be removed. In the Mills Building, there was hardly a window opening in which the terra-cotta sills, jambs and heads were not badly cracked. From the street, they had the appearance of being in good order. Walls of ordinary red brick and mortar were destroyed in many cases, especially in buildings of Type 2, where the fall of the interior frame pulled down the wall. There are many instances of the integrity of such walls, especially at corners; while many of them were injured in the earthquake, it is not believed that this was a factor of much importance in the fire. The damage to standing walls in all buildings was the spalling of the red brick, sometimes to a depth of one inch.

Foundations.—No foundations were found injured by the fire.

Floors.—Only two kinds of floors were exposed: terra-cotta and concrete. Of the two, terra-cotta suffered the more, being in all cases, where directly exposed, completely destroyed. Terra-cotta floors, built with flat arches and with plaster applied directly, were all destroyed. The general effect was a spalling of the lower section of the tile structure and a disintegration of the mortar joints. The tile also became brittle, breaking with a slight blow. All terra-cotta was of the dense type, no porous tile being used. In the James Flood Building, tile arches were used, being of the regular arch construction. They were covered with four inches of concrete, and protected by a wire-lath ceiling. They escaped injury except where the ceiling lath fell, and there the lower layer spalled off.

Concrete floors generally had hung ceilings, and, where thus protected, were uninjured. Where exposed, the concrete is in most cases destroyed, for instance, in the Sloan, Rialto, and Aronson Buildings, and the Crocker Warehouse. The concrete is dry, and while in many cases hard, yet all the water has been burned out and it may be said to be destroyed, even if able to support weights. Floor coverings of wood invariably burned, adding to the destruction. Sleepers were generally burned. Surfaces of cement mortar fared much better, the linoleum covering remaining practically intact.

Partitions.—Partitions were of terra-cotta tile, and of wire-lath and plaster, either solid or hollow. All kinds were destroyed. In the tile partitions the mortar joints were disintegrated, the plaster was destroyed, and the tiles were made brittle. One could pull down with the hand any partition in the Mills Building, all of which were of tile. Metal lath and plaster partitions were completely wrecked, but the lath might be considered as salvage. The use of wooden grounds around doors and transoms helped the destruction, but it is difficult to see what would have prevented the damage.

Steel Frame.—The steel frames were the least injured of any part of the various structures. Where properly protected, there was no injury. Where the protection was faulty, or where there was none, the destruction was complete.

Cast-iron columns were used in a few buildings of Type 3. As a rule, not as much care was taken to protect them as in the case of steel columns. Numbers of cases have been observed of the melting of cast-iron columns, especially lugs, in buildings of Type 2. In Type 3, the most conspicuous example is that of the Sloan Building, used as a carpet and furniture store. A number of columns in the basement, covered with one layer of lath and plaster, melted so that the metal ran together into a lump, lowering the floors from one to four feet, and completely wrecking the building. The basement was full of linoleum. In the Wells Fargo Building, with cast-iron columns protected by double lath and plaster, and used as offices, no damage resulted.

Steel columns fared about the same. In the Fairmount Hotel, probably 25 per cent. of the columns was destroyed. These columns had practically no protection, being built in between lath and plaster partitions. These partitions had interior blind spaces of from six to eighteen inches in width, and, in many of the wall columns, the space extended from the first floor to the roof. To stiffen the partitions, studding of timber, 2 by 4 in., 4 by 4 in., and 4 by 6 in., was used everywhere. The burning of the timber directly against the unprotected column, in addition to the general fire, destroyed it.

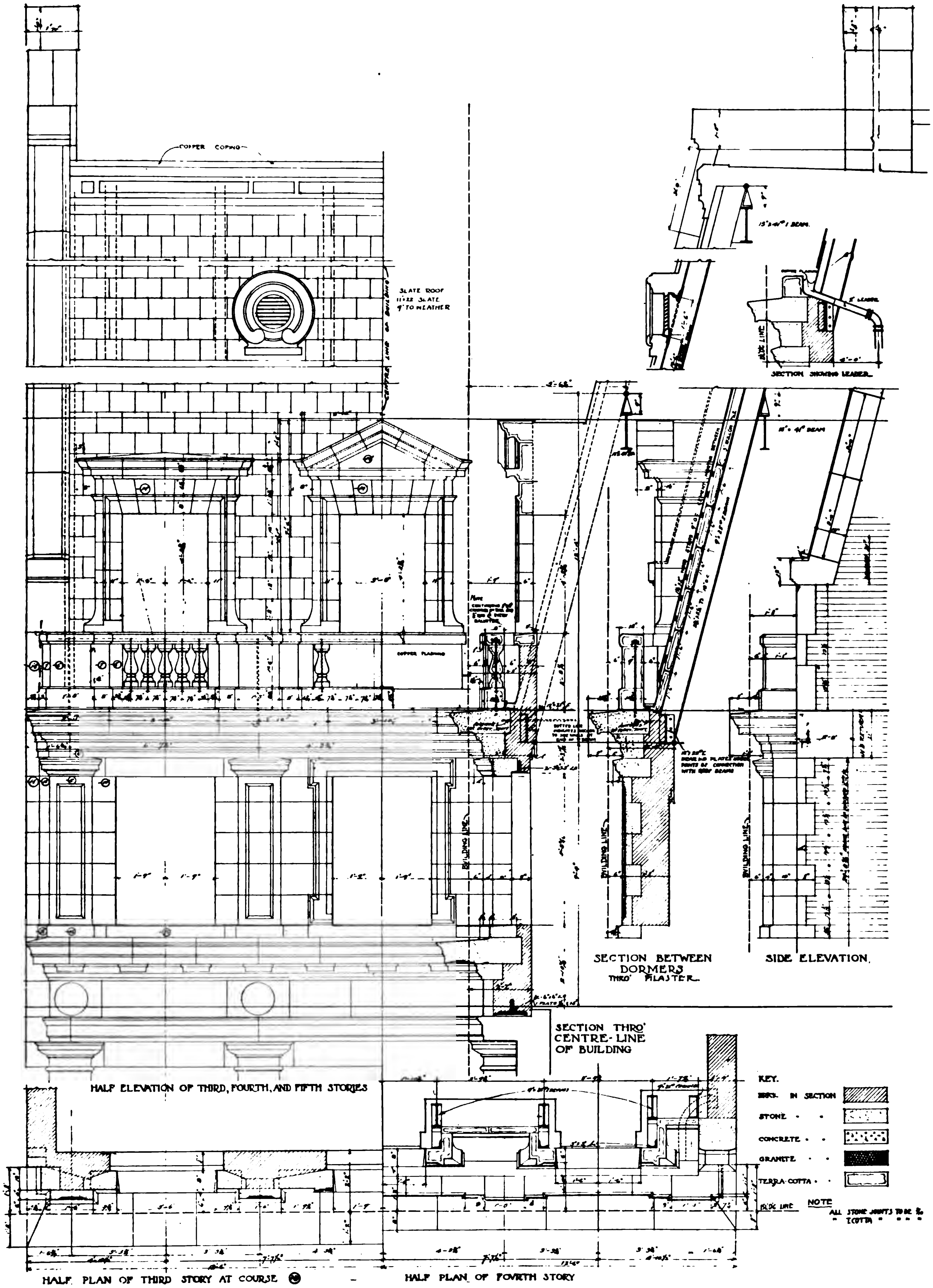
In the Hotel Alexander an apology of wire lath and plaster was used as a fire-proofing. It was cut into everywhere for door frames; and thirty-nine column sections were destroyed. In the Aronson Building, the terra-cotta fire-proofing fell away, and ten column sections were buckled. One case of this kind occurred in the Mills Building, and several columns were bent, for the same reason. One column section was similarly wrecked in the Crocker Building, and two sections were bent in the St. Francis Hotel, where the tile fire-proofing had been cut away to allow the placing of rolling doors. It may be stated that every instance of failure can be thus explained.

Steel beams and girders were bent where unprotected, but remained uninjured otherwise. Much of the injury was suffered in first floors; basement and sidewalk beams, as a rule, having the lower flanges unprotected. Comment on protection is offered below.

Most roofs were simply of beam construction, similar to the floors, but the damage was generally less, owing to the protection afforded by hung ceilings. The trusses in the Mutual Life Building were covered with tile, which failed to protect, allowing the trusses to fall and damaging the supporting columns. A number of roofs were destroyed from lack of adequate protection, generally, where made of terra-cotta, the Crocker and Spring Valley Water Company Buildings being examples.

Ceilings.—Where ceilings were made by plastering directly upon terra-cotta flat-floor arches they were completely destroyed. Where metal-lath hung ceilings were used, the plaster was destroyed, but the lath generally remained in place, and was not damaged. Where copper wire was used to fasten the wire lath it failed, dropping the ceiling. Such wire should never be used.

Miscellaneous.—Vaults in offices, where made with doors set in terra-cotta, or wire-lath and plaster box, failed everywhere, the contents being burned. Vaults made with an iron box covered by fire-proofing fared much better. Safe-deposit vaults in the basements of banks were uninjured, which suggest similar devices for the tenants of large buildings.



UPPER STORIES: DELTA-PHI CLUB-HOUSE, W. 116TH STREET, NEW YORK, N. Y.

All plaster was destroyed. Marble tiling for floors was a complete failure. Marble treads for stairs failed, as also all wainscoting of that material, the marble being calcined.

Wire-glass covering of skylights resisted the fire well, except where the glass melted. Temperatures that melted glass were reached everywhere.

Metal-covered window-frames, doors and door-frames were used in the Kohl Building, the upper six-stories of which were not burned. No opinion is offered, except that this building was not much exposed, the glass of the exterior windows not being even cracked. The metal trim undoubtedly acted to deter the spread of fire within the building.

Steel shutters were used in the Telephone Building, but it was completely burned. It is claimed that the fire entered through some unprotected windows.

Elevator-grills were generally destroyed, together with the cages and machinery above the basement.

Some questions may arise as to the temperatures during the fire. Glass was melted everywhere. The softening of cast-iron columns in the Sloan Building has been referred to. There were numbers of cases of the actual melting of cast-iron columns, and in many buildings steel was melted. Cases of the latter were observed in a dry-goods store, where numbers of I-beams were fused; and also in a machine-shop, where steel rods were fused.

Conclusions.—Any deductions from the fire must be those based upon a general conflagration, and not those of an isolated fire. In view of the complete destruction of all materials it becomes a question as to what should be done to make a building fire-proof.

San Francisco was built probably in about the same way as other cities. It is an error to say that it was a wooden-frame city, as the business district was generally composed of buildings with brick walls. In among these had been constructed the so-called fire-proof structures, exposed on all sides to danger by the burning of the inflammable structures around them.

The only statement that can be offered is that the best insurance for buildings would be the isolation of a district containing nothing but fire-proof structures. A general conflagration would then be impossible. Manifestly, this is impossible in San Francisco, where business must be resumed with the least cost. In many cities, it would be good insurance for men owning large buildings to combine to buy out old and inflammable structures, either demolishing or rebuilding them. Otherwise, there remains the danger of general conflagrations, such as those at Baltimore and San Francisco, in which fireproof buildings will be injured from 30 to 60 per cent.

Turning to the individual building, the question of the exterior walls must be settled. There does not seem to be much choice of material. Architectural considerations demand the use of brick, terra-cotta, or stone. With a steel frame supporting the walls at each story, any local fire will destroy the nearby facing, but it may be removed without damage to adjoining parts. This cannot be done when walls are self-supporting and the facing acts as a part of the wall. This risk of damage must always be carried, gradually becoming less as inflammable buildings are eliminated.

There is no doubt that the steel frame is adequate for all its purposes, but it must be protected. This brings up the general subject of fire-proofing, in which is involved the construction of floors and partitions, and ceiling and column protection. Where any reasonable protection was given the steel frames of buildings in San Francisco, the steel was uninjured, and hence the writers feel warranted in stating that it is possible to protect such a frame so that it will pass uninjured through a fire that consumes all parts that can burn.

It was stated previously that all materials were destroyed by fire; it follows, from this, that the destruction of fire-proofing must be expected, and that it will have to be restored after a fire. It becomes a question, then, of selecting the material that will stand up best, for the fire-proofing must retain its form, even if destroyed.

In the writers' judgment, the column should be of a closed form, such as channels and plates. This is preferable to latticed columns. For columns, the fire-proofing that will stand up best is red brick set in Portland-cement mortar. Equal to this is a casing of solid concrete at least 4 inches thick, with a mesh of reinforcing metal. Examples were found in the St. Francis Hotel and Shreve Building, where the concrete was uninjured. In the Fuller Building, which was used as a paint and oil warehouse, the floors were of wood, and the columns were covered with from 4 to 5 inches of concrete. This protection held in place when the columns fell. It was completely destroyed, but the column shafts were protected. Next in order, and of equal merit as far as examples show, is the double wire-lath and plaster protection, which, in the Wells Fargo Building, afforded complete protection. In many buildings, columns were protected by one layer of lath and plaster, directly applied, and then the entire column, with pipes, etc., was enclosed by the regular partition. This afforded complete protection, and the Merchants' Exchange and Kohl Buildings are examples. The examples of the Fairmount and Alexander Hotels are not included, as obvious defects in design and execution warrant the statement that the columns in these buildings were practically unprotected. The same remark also applies to the melted cast-iron columns of the Sloan Building.

The remaining examples of column failures must be laid to the failure of terra-cotta tile. The work in the Mills, Crocker, and Aronson Buildings was well done, but in all, and in the latter case especially, it failed utterly to afford complete protection. As the failure of one column section means the practical destruction of all floors supported by that column, the results are serious. In justice to the terra-cotta tile, it must be said that in the St. Francis Hotel, the Union Trust, and some other buildings, it stood up well enough to protect the columns. The writers believe, however, that it is the least valuable of all materials commonly used for fire-proofing.

For floor construction, some form of reinforced-concrete is far preferable to tile. In all cases the record of concrete is better than that of tile. Connected with this is the protection of the lower flanges of beams and girders. The fire shows that a cover of lath and plaster directly upon the flange, protected again by the suspended ceiling, is the best. The layer of plaster alone on the flange will not protect. Neither will the thin piece of terra-cotta strapped on. It may be stated here that one of the most obvious lessons taught by this fire is the protection to concrete floors and floor beams by the suspended ceiling of lath and plaster. In all cases where used, it afforded complete protection. Where not used, concrete was destroyed and beams were distorted.

The subject of partitions is bound up with that of column protection. Terra-cotta tiles are inferior to lath-and-plaster, although both were destroyed. A partition may be destroyed, but, if it stands, it impedes the spread of fire, and, in this light, the lath-and-plaster type is superior to tile. It should be possible to construct better partitions, but as yet no better ones have been offered.

A logical deduction from the statement that all materials were destroyed is the conclusion that all structural parts of a building, of whatever material constructed, must be protected by another material which will be a more or less complete loss in a fire. This applies to a steel frame, to floors of any type, and to roofs. It is impossible to protect some parts, such as fronts, partitions, and other parts directly exposed. The floors and frame constitute the structural parts, failure of which means destruction of the building. All such should be fire-proofed. This remark applies with equal force to buildings with reinforced-concrete columns, girders, beams and floors. As integral structural parts, they should be fire-proofed as well as similar members of a steel-frame structure, *for concrete is destroyed by fire nearly as quickly as steel.*

No further comment is offered, except the following: Buildings with wooden floors will be completely destroyed in a fire. Such parts as metal trim, wire-glass, and steel shutters, were not used to sufficient extent to warrant any definite conclusions, except to say that what showing there was was favorable. Whether the expense is warranted was not determined. Bad work and indifferent construction will cause any material to fail. Good work will enable a poor material to stand up. Fire-proofing should be continuous, and at no place should it be cut into for the passage of pipes, etc. The subject of pipes should be treated as it deserves, and proper ducts and shafts should be provided, instead of allowing them to be placed anywhere, where they will give the least trouble.

It is hoped that comment will be received on this report, but it is trusted that it will be in the nature of criticism, and not in the way of advocacy of some one form of construction.

THE CASA GRANDE RUINS.

IN the heart of the Southwest, says the Washington correspondent of the Boston *Transcript*, in a region formerly forsaken by whites and little frequented by Indians, lie the traces of an ancient city buried by desert sands. Many tumbled walls smoothed flat with the burning plain are marked, grave-like, by the still remnants of a building. In the Gila Valley, Ariz., this lone ruin, christened the "Casa Grande" by the Spaniards of the Territory, has since October been the object of investigations, under a special appropriation of Congress, by an archæological expedition of the Smithsonian Institution.

The Casa Grande is twelve miles from the Santa Fé system of railroads and eighteen miles from the Southern Pacific—an easy trip across the desert from Florence, Ariz. It has furnished material for much surmise and recently for actual scientific investigation—surmise dating back as far as the gold-seeking invasion of Coronado in 1540.

The ruin has been brought three times to the attention of our national legislative body. It lies upon public lands and is therefore under national control. Early, however, it paid the price of many valuable relics by suffering from the too devoted attention of souvenir hunters. About fifteen years ago Congress recognized its importance by appropriating $2,000 for its repair and preservation—following upon private explorations which at the time aroused much general interest. Victor Mindeleff, archæologist, was sent to supervise the construction of a guard against the wear of the elements, and a custodian was appointed to protect it against too curious sightseers. Last year Casa Grande again brought an appropriation—this time $3,000, and for the fiscal year ending June 30, 1908, a like sum has been granted.

As provided by the terms of the more recent appropriations the work was placed under the supervision of the secretary of the Smithsonian Institution, and Dr. J. Walter Fewkes, of the Bureau of American Ethnology, was chosen as the most available member of the Smithsonian staff to undertake the excavations. He set out on October 17, arriving on the scene October 24, and since then has accomplished appreciable results.

A good description of the spot is given by one of the predecessors of Dr. Fewkes. He says:

"The Casa Grande ruin (the single standing building) is located near the southwestern corner of the group, and the ground surface for miles around it in every direction is so flat that from the summit of the walls an immense stretch of country is brought under view. On the east is the broad valley of the Gila River, rising in a great plain to a distant range of mountains. About a mile and a half to the north a fringe of cottonwood trees marks the course of the river, beyond which the plain continues, broken somewhat by hills and buttes, until the view is closed by the Superstition Mountains. On the northwest the valley of the Gila River runs into the horizon, with a few buttes here and there. On the west lies a range of mountains, closing the valley in that direction, while toward the southwest and south it extends until in some places it meets the horizon, while in other places it is closed by ranges of mountains blue and misty in the distance."

The accounts of visitors to this particular ancient town on the banks of the Gila River trickle along the course of time ever since white men landed in the "New World."

When the adventurous members of Coronado's expedition in 1540 braved the scorching sands of the north Mexican desert, they halted in amazement at the ruins of a long-deserted, sand-topped city hiding the secrets of a people older than the Indians. Castaneda, the scribe of the invasion, wrote with appreciation of the relic of a supposed fortress which had been destroyed long before by barbarous tribes, perhaps ancestors of the Apaches. In 1694 a Jesuit father, wandering in penance, chanted a mass within its walls, recalling the spirts of departed chiefs of whom we are left no written record. While the white colonists of New England were struggling, in 1775, to throw off a yoke binding them to Europe, an ecclesiastic, Padre Font, was living in a room of the Casa Grande, writing the deeds of a nation whose prestige had already waned at the approach of a mightier tribe.

In 1846 Lieutenant Emery and Lieutenant Johnston saw and wrote of the ruins, and Major John Russel Bartlett later described them with admiration. Mr. A. F. A. Bandelier, traveling for the Archæological Institute of America, was the next to mention them in notes on a trip as far south as Central America. These accounts were followed by a partial report, in 1888, by Mr. Frank Hamilton Cushing of the "Hemenway Southwestern Archæological Expedition" from which the party returned laden with specimens of carved stone implements, highly decorated pottery and burial urns, but above all with a vivid description of the customs of the extinct people of the region. In settling up affairs of this expedition Dr. Fewkes came into actual touch with the archæology of Arizona.

The Hemenway explorations were general. The work of Dr. Fewkes is limited to the buried city about Casa Grande, which he firmly believes, as he writes to the Smithsonian, will be one of the great spectacles of the region—"an American Pompeii for sightseers, as well as an object-lesson for students of American archæology and history."

"The Casa Grande group of mounds," he says, "is composed of three walled clusters of buildings or compounds, now for the most part buried in the earth." In his reports he has labeled these compounds A, B, and C. "Compound A" he is excavating. "Compound B" is close at hand. He describes it, writing from his tent upon the grounds: "It is a noble ruin and as I see it now looming among the mesquite trees I fancy the stately buildings that some one, some day, will uncover there."

Dr. Fewkes has already unearthed much of the first group of structures in which stand the walls of the "great house." As the sand is dug out, the mystery of its meaning gradually clears. It can hardly be a massive temple of sun-worshippers, as a former traveler surmised, but it is more probably a place of refuge, a stronghold in which there may have resided a powerful chieftain of bygone days who exacted homage from his vassals. The group proper is slightly over 400 feet long by 200 feet wide, surrounded by a solid wall of pressed earth a yard or more thick, and now from eight to fifteen feet high. On two corners have already been unearthed an eight-room bastion and a two-room lookout. The great house itself rests about the center of the enclosure, flanked by plazas and groups of smaller houses arranged on an ordered plan. On one side is a large opening, probably the entrance, and about the whole, outside the wall, run traces of a ditch which connects at one corner with an adjacent depression in the ground.

Beyond the walls are mounds of all sizes and shapes—mounds which prodding has proved to be of as many origins. There are mounds of earth left from clearing out springs. There are mounds formed of ashes and débris. The larger ones are burial mounds—treasure-houses for the archæologist—rich in mortuary offerings and human remains. There is a fourth class of many remains of "ultra-urban single houses" which may hold the solution to the makeup of the whole city.

What sort of people were these first Americans who have left only silent evidence of their pre-Columbian life? It is established that they were ancestors of the Indians—that they bore little resemblance either to Asiatics or to Africans. Wherever they came from originally, they must have been Americans for many generations. Closely allied to the Pima tribe of the present day, conservative estimates would place their number well up into thousands in each city.

It has been a pet theory of ethnologists to account for these vast Western ruins by a series of many occupations of the same site, marking each return by the construction of a "temple" or a "gathering place" or a "compound," as Dr. Fewkes has termed these large blocks of buildings. One relic at least speaks of a vast population in words that are clear—the network of irrigation ditches constructed from the Gila and Salt rivers. Dug, as they must have been, with crude stone implements, the dirt was then laboriously carried away in baskets strung across the backs of the women. Imagination will conjure up the number of workers necessary to complete in this manner a ditch found by Mr. Cushing traceable, at least calculation, for thirty-eight miles.

All the Arizona investigations of the Smithsonian Institution are being conducted with scientific caution. Much of the labor is performed by Indians, who are perhaps the descendants of the very men whose homes they are unearthing. Such relics as have been discovered will be carefully shipped to the National Museum to be compared by experts with other specimens of Indian work. Dr. Fewkes has reserved his own conclusions until the completion of the excavations, when whatever definite theories he may have established will be embodied in a complete report on the Casa Grande and its vicinity. One of his most recent letters to Secretary Walcott says:

"I believe the excavation and protection of the ruins on the Casa Grande Reservation may be made the most important archæological work the Smithsonian has ever undertaken, and if completed as begun will be valuable contribution to the 'advance-

ment of knowledge among men.' Allow me to emphasize one feature of the archæological work of the Smithsonian at Casa Grande this winter. So far as I know, up to the present year no museum, institution or private worker has ever done anything to protect and preserve walls of buildings in Southwestern ruins, brought to light by excavations, but have left them to be destroyed by the elements.

"By protecting the walls, as well as specimens found in archæological excavations, the Institution has inaugurated a new epoch in Southwestern field-work."

COMMUNICATION

THE LOUISIANA PURCHASE EXPOSITION COMPANY AND THE GUESSING CONTESTS.

To the Editors of the American Architect:

Dear Sirs:— In the *American Architect* of March 16 appeared an editorial regarding the casting in bronze of the statue of Saint Louis, in which was the following:

"Mr. Niehaus would, perhaps, have a better chance of recovering something if the officials of the Exposition had not just been compelled to pay, after long dispute, the prize of $25,000 they offered to give the person who guessed with nearest accuracy the number of paid admissions to the grounds."

The quotation has reference to litigation over the prize in a guessing contest about admissions to the World's Fair of 1904. With this contest the officers and directors of the Louisiana Purchase Exposition Company had no connection directly or indirectly. The contest was one of several conducted by newspapers and magazines. In this particular case the facts were that several persons claimed to have won the prize and entered suit. The parties conducting the contest paid the money into court, where the claimants contended for it. The writer can state of official knowledge that the Exposition Board of Directors had no connection with this or any other guessing contest. Early in the preparations for the Exposition several propositions were made to the executive committee to conduct contests and applications were made for concessions, the Exposition to have a percentage of the profits. Every one of these propositions was rejected by the unanimous decision of the executive committee of the Board of Directors. The Board of Directors decided as a matter of policy that the Exposition management should not give official sanction to any enterprise of this kind. That policy was maintained to the end of the Exposition. So far as the writer has knowledge, no officer or director individually of the Exposition Company was interested in or had any connection with the guessing contest referred to in the editorial.

The Exposition management has up to date met every financial obligation and is rapidly winding up the affairs of the corporation. It is the purpose of the management that every just claim shall be met.

Will the editor kindly give space to the above.

Respectfully,

Walter B. Stevens,

Secretary Louisiana Purchase Exposition Company.

[We regret that in this respect we should have done injustice to the Exposition Company through giving unjustifiable credence to a report published in the daily press.—Eds. "American Architect."]

ILLUSTRATIONS

THE ENGINEERS' CLUB, WEST 40TH STREET, NEW YORK, N. Y. MESSRS. WHITFIELD & KING, ARCHITECTS, NEW YORK, N. Y.: FIVE PLATES.

This building, though connected with, is not to be confounded with the Engineering Societies' Building illustrated in our last issue. It provides for the social needs and accommodation of the same memberships whose intellectual requirements are fostered in the latter building, as already described. The club-house, to which was devoted $450,000 out of the gift of Mr. Andrew Carnegie to the allied engineering associations, is practically finished and ready for its house-warming.

THE DELTA-PHI CLUB-HOUSE, WEST 116TH STREET, NEW YORK, N. Y. MR. THOMAS NASH, ARCHITECT, NEW YORK, N. Y.: THREE PLATES.

Additional Illustrations in the International Edition.

ETON COLLEGE VIEWS, WINDSOR, ENGLAND: FOUR PLATES.

NOTES AND CLIPPINGS

Modern Electric Lamps.—The striking feature, says the Boston *Transcript*, of a paper recently read before the Academy of Arts and Sciences by Dr. Louis Bell, was the fact that the new calcium arc is shown to be in a class by itself when economy in the consumption of the current is considered. At the time of the presentation of the paper there were not more than half a dozen of them in the city, but the business man is quick to see things that lie to his advantage. They are now used quite a little where strong illumination is desired, at such places as hotel canopies or the entrances to places of public resort. They are the great, blazing arcs which flood the street with yellow light and are admirable for out-of-door spaces or large halls. They are a great deal the cheapest electric light known, so far as consumption of current is concerned, but the carbons are a foreign product, hedged in by a protective tariff, the lamp is also of foreign make, and there are probably royalties, so that the true commercial efficiency does not as yet stand forth in its due proportion. The cheapness of this calcium arc may readily be seen from a glance at one of Dr. Bell's tables, in which the different lamps are compared in the single element of consumption of current, the item for which the monthly electric-light bill is presented:

Lamp.	Watts consumed per candlepower.
Calcium arc	0.2
Mercury arc	.33
Magnetite arc	.4
Geissler tube	.4
Carbon arc	.8
Osmium filament	1.25
Tungsten filament	1.3
Tantalum filament	2.
Carbon filament	3.5

One does not need to have much technical knowledge of electrical measurements to realize that the calcium arc consumes only one-quarter as much current as the ordinary arc light. Other things being equal, a merchant can light his warehouse or a railway company its station at one-quarter of the cost for the electricity. This great yellow light, then, for most purposes of general illumination is enormously efficient. Its disadvantages are, first, that the carbons are soft and will require trimming each day instead of once a week, as with the present lamps. The second disadvantage, one which will affect its introduction into some kinds of stores, is that it is yellow, and when colors are involved it is misleading.

Scientifically considered, the next most efficient light is the mercury arc. This is almost unknown in Boston, and is a radical departure from the familiar forms of arc or bulb. It is neither the bright spot nor the brilliant filament, but a tube filled with purple, glowing pulsating light. It has the effect of the geissler tube, but in a single color. Practically speaking, it is an impossible light. The bluish tint diffuses itself well, but it kills the colors with which it comes into contact. The person who sits under it becomes livid and ghastly. It has been tried in a schoolroom or two in the larger cities, but the pupils, as described by a visitor, "are dead, but called again into motion." It has some consequence from the photographer's standpoint, but in the words of a prominent New York artist, "it is necessary to begin a new education as to color values."

The Philæ Temples.—In the annual report issued a few days ago by the Egyptian Public Works Ministry, we notice a statement to the effect that the masonry of the buildings on the Island of Philæ appears to show no indication of injury in consequence of its periodical submersion by the waters of the Assouan Reservoir. M. Maspero, the able director of the *Service des Antiquités*, says, in his departmental report, that after his return from Nubia in 1905 he made an examination of the buildings and observed with pleasure that they had in no way suffered since the preceding winter, and adds that they may now be considered as removed from all immediate peril. It is by no means certain, however, whether this favorable state of things can be expected to continue indefinitely, for, as M. Maspero justly remarks, "we have not at present any means of judging whether their periodical submersion will not become fatal in the long run." In the meantime it is satisfactory to find that the only attention necessary last year was to wash away the incrustation of saline matter left by the receding waters, and to make good a few joints in the masonry from which the cement had fallen out.—*The Builder.*

The American Architect and Building News.

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ONE year after fire broke out in wrecked and crumbled San Francisco the presidents of the various fire-insurance companies centering in Hartford, Conn., gave expression to their present views of the disaster in a series of letters published in *The Times* of that city. With one of the opinions, expressed by the president of the Security Insurance Company, we are heartily in accord. Mr. Alling intimates the belief that "the public has learned from this great disaster the practical lesson that fire-insurance companies know pretty well how to manage their business; that they serve a great and useful purpose in industrial affairs, and that they deserve popular confidence and support." Although, coming from an insurance manager, this savors a little of special pleading, it is too true not to meet with general acceptance. From the very first, the one impressive factor in the whole disaster has seemed to us to be the manner in which the insurance companies proceeded to liquidate their losses, honorably, promptly, and with such supreme financial skill that a general commercial panic was avoided. Just what those losses will finally prove to be cannot thus early be told. The ill-disposed are at the moment making much of the fact that on the last day of the year allowed for the filing of insurance claims before the court some two hundred claims were entered; but it is only natural that there should be many claims that can safely be paid only after adjudication by a court. Statistics vary not only as to the total insured and uninsured losses—which are variously stated as three hundred, five hundred and eight hundred millions of dollars—but as to the losses that fell on the insurance companies, these being stated as between $225,000,000 and $235,000,000, while actual payments at present approach $180,000,000. The insurance matter far outweighs in interest the matter of fireproof building methods and materials, for it has brought out emphatic testimony as to the honor and capability that lie at the core of American commercial life.

FATHERS, forgetting that they themselves have been boys, often try to persuade their sons that nothing is more foolish and less manly than undertaking to do an absurd thing because they have been "dared" to attempt it. It looks very much as if architects, like boys, found it impossible to "take a dare" and interpreted the erection of each new skyscraper as a direct challenge to build one that would be more altitudinous. The latest architects to resent the imputation on the actual color of their livers and the plumage they affect are two who operate in Pittsburgh, and it is said to be their present hope to be able to manifest their skill and courage by erecting a building seven hundred feet high, though we conceive that they will signalize rather the vulgarity of their artistic perceptions and the undeveloped condition of their imaginative faculties. To do a thing simply because it can be done is an extremely poor reason for doing it: if it were a good and valid reason, then it would be proper to begin at once to cut a ship-canal from Sandy Hook to the Golden Gate, or to extend the proposed skyscraper to a height of seven thousand feet instead of stopping at the lowly seven-hundred-foot level. A condition that makes the alleged enterprise especially obnoxious is the fact that the site selected for this new manifestation of the surrender of the art of architecture to the science of engineering is now occupied by Richardson's Allegheny County Court-house, against whose suggested alteration, even, most of the architects in Pittsburgh and a very large number of those practising elsewhere protested vehemently, as being a "desecration," two or three years ago, and it is quite possible that the names of the architects of the proposed skyscraper might be discerned in the list of the said protesting architects.

WE desire, on behalf of the profession at large, to express to the editors of the Pittsburgh *Dispatch* our appreciation of their own sense of decency and rightmindedness. In an editorial, under the caption "Where Honor is Due," it is pointed out that though, during the ceremonies attending the reopening of the Carnegie Institute, much mention was made of Mr. Carnegie and of sundry other notables, "in the cata-

logues and formal mention of the proceedings little, if anything, was said of the architects of this building." Although Messrs. Alden & Harlow realized that they were involved merely in the oblivion that usually envelops the responsible architect on such occasions, it must be pleasant for them to discover that there is one newspaper editor willing to do them honor in their own country. The architects are all the more deserving of applause since they are said to have succeeded in erecting and equipping the building within the limits of the original appropriation.

A REAL light-and-air case is somewhat of a rarity in an American court, but the case which has just been decided against Mrs. Whitelaw Reid in the Appellate Division of the New York Supreme Court is interesting for its own sake. At the time when what were originally known as the "Villard houses" were built on Madison avenue, New York, the lot No. 29 East Fifty-first street, at the rear of these houses, was set apart under stringent restrictions that forbade its ever being improved or built upon, the object being to secure forever to the Villard houses and to such others as might later be built on the adjacent lots light, air, prospects, ingress and egress. In course of time the fee of this restricted lot vested in Mrs. Reid, and she, thinking it unfair she should have to pay taxes on land she was forbidden to improve, sought means of getting around the terms stated in the deed of conveyance, and the suit and the appeal now decided against her were the results. The court very properly points out that when she accepted the deed she accepted also its restrictions, and that as she never had owned the right to obstruct the land with improvements, since such right never was conveyed to her, she has no redress. We can quite appreciate how irritated Mrs. Reid must be, for the real-estate owner is so accustomed to pocketing the "unearned increment," due to advancing land values, without making an accounting to any one, that it must be uncommonly uncomfortable to find that, in your case alone, the boot, somehow, has got onto the other foot.

WHEN New Yorkers were reminded this month that it was only a hundred years ago that a commission was appointed to lay out the streets on Manhattan Island north of Houston Street, a commission who decided on the present checkerboard arrangement of numbered streets, a good many of them wished that the commissioners had enjoyed a more enlightened understanding. It is very curious, and its explanation must be found in the existence of a local habit of which the causation is indeterminate, that in laying out the town the commissioners saw fit to shut their eyes to the great utilitarian advantage of the narrow service streets, rear alleys or *ruelles* that in London, Boston, Baltimore and elsewhere separate and serve the houses that front on streets parallel to them. The one piece of wisdom shown by the commissioners in 1807 was the making of every tenth street or so of more than the average width, and it doesn't much matter whether they really intended that these wider streets should act as fire-breaks, or whether, in order that their checkerboard might work out to twenty blocks to the mile, they simply threw into them the odd feet. The result was that, so long as the buildings were low, these wider streets had a certain value in time of conflagration, a value which has already been lost through the increase of the height of the abutting buildings, as will be clearly shown whenever a conflagration really gets started.

TO restore the present city as a whole to that degree of safety which it enjoyed, say, fifty years ago, the authorities should restore or provide a substitute for these earlier and automatic fire-breaks. This can be done only by increasing the width of these wide streets relatively with the increase in height of the buildings that now abut on them—a cure which is quite out of the question—or by making these abutting buildings themselves absolutely fireproof, and so forming them into real fire-walls stretching from river to river. This step, which really ought to be taken, can be effected gradually by causing all new buildings on these streets to conform to laws of extreme strictness—provided a conflagration will be polite enough to wait until the last cranny has been chinked up. Or, more wisely, the authorities might select a narrower street fronted mainly by low houses, and rebuild them as model lodging-houses of an absolutely fireproof type, but of varying cost and style, so as to accommodate the different classes who now naturally grade from the centre of the island to the river shores. The public can protect itself from the evils of a conflagration as much by doing its own building in a proper manner as it can by introducing a more abundant water-supply or enlarging its fire-fighting force; and the first method is no less legitimate, but is as proper a field for expending the public funds, as are the other two. It is not a usual method, and, of course, the first cost would be large, but Americans are not much given to being afraid either of novelty or cost.

THE Boston *Transcript*, which, to most persons' surprise, was several years ago a persistent opponent of the movement that finally resulted in preserving the "Bulfinch Front" of the Massachusetts State-house, is just now assuming a rather I-told-you-so attitude, because of the movement just now to build an annex at the rear of the present Extension, so as to house several departments for which the State now has to pay rent to private landlords. But the *Transcript* is fair-minded enough to point attention to a fact that is generally lost sight of; indeed, we do not remember seeing it mentioned in connection with any earlier similar instance. It is pointed out that, although the State may have to pay rent, the landlord has to provide care and maintenance, and that if "any government agency in this country has ever erected a building the care and maintenance of which, even with the low rate of interest at which public authorities can borrow, did not make it really more expensive than the quarters which had formerly been hired, such a public structure is a curiosity, and ought to be put on exhibition at Jamestown."

ACTIONS BY ARCHITECTS FOR THEIR FEES.

Quantum Meruit—Delegated Authority to Contract.

TWO interesting and important cases have recently been decided in the Missouri and Kentucky courts, both on *quantum meruit* and one involving the question of the delegation of authority to contract for the preparation of plans and specifications by a public board. These cases may be reviewed in connection with several other cases on *quantum meruit* for architects' fees, some of which are also concerned with the question of the delegation of authority to contract. The first of these cases, Harms *vs.* Sheppard, was decided in the Kentucky Court of Appeals, February 6, 1907, 98 *"Southwestern Reporter,"* 1012. It was an action by an architect on a *quantum meruit* for $300 for a certain plan and specifications for the erection of an apartment-house made by the architect for the defendants by their request, and for the further sum of $600 for a second plan and specifications, which the plaintiff claimed to have made and furnished to the defendants upon their order for the erection of the building. The petition averred that it was estimated by the parties that the building would cost $30,000. The plaintiff alleged an agreement to pay him a commission of two per cent. on the estimated cost of the building, for the last prepared plans, amounting to $600; $200 had been paid on account, leaving unpaid $700, the total sum sued for. The defendants admitted the preparation of the plans and specifications at their request, but averred that the first seven drawings and specifications were rejected, and not to be paid for, because to follow them would have made the cost of the building exceed the amount the defendant intended to expend thereon; and that for the last plan and specification the plaintiff, by agreement, was to receive no compensation if the cost of the building exceeded $20,000, and that, as the cost did exceed that sum, he was entitled to nothing. A trial was held and verdict and judgment were given in favor of the plaintiff for $500. A motion for a new trial was made by the defendants on the grounds that the verdict was excessive, and given under the influence of passion or prejudice; that the jury erred in the assessment of the amount, and that the verdict was not sustained by the evidence and was contrary to law and the instructions of the court. On appeal, however, the court held that the amount of the verdict, $200 less than the plaintiff sought to recover, was not so excessive as to indicate passion or prejudice on the part of the jury, since the evidence adduced was sufficient to prove the plaintiff's skill as an architect, his employment by the defendants, the value of the work performed for them, and that his compensation was to be in no way affected by the fact that the cost of the building might, or did, exceed $20,000. While the terms of this agreement with the defendants were in the main proved by his testimony alone, other witnesses, architects and builders, testified as to the sufficiency of the plans and specifications furnished by him to the defendants, also as to the time and labor expended by him in making them and the value of his services. The defendants' testimony as to the character and terms of his employment strongly tended to contradict the plaintiff, and to prove that for the first plan and specifications he was to receive no compensation because of their rejection by them, and that the plan and specifications last furnished were not to be paid for, or his labor compensated, because the cost of the apartment-house exceeded $20,000. The evidence was conflicting on these points and irreconcilable; but the court held that it was not its duty to determine how the jury should have decided the case upon the evidence. The court's duty terminated with ascertaining whether the questions of fact had been properly submitted to the jury, and whether there was evidence to support the verdict.

In the other case, Cann *vs.* The Rector, Wardens and Vestrymen of the Church of the Holy Redeemer, Missouri, 98 *"Southwestern Reporter,"* 781, the decision ultimately turned upon the question whether the vestrymen of a church had delegated authority to the rector, who was president of the vestry, to direct and control the preparation of the plans for a church building, so as to put it out of the vestrymen's power, the architects having followed the rector's directions, to reject the plans because they were dissatisfied with them. This case came up on a prior appeal in 1905 (Cann *vs.* Rectors, Wardens and Vestrymen of the Church of the Holy Redeemer, 111 Missouri Appeals, 164, 85 *"Southwestern Reporter,"* 994), where the court held that the plaintiff could not recover upon the evidence adduced. It appeared from the evidence of the plaintiffs that the plans and specifications were prepared under the direction and authority of the rector, and were for a building to suit his express wishes. One term of the written contract of the architect was that the plans and specifications should be satisfactory to the owner; that is to say, the vestry or governing body of the church. That body rejected the plans as prepared by the architect because the vestrymen thought the cost of building in accordance with them would be too great. To meet that objection the plaintiffs introduced testimony tending to show that they acted under the direction of the rector in preparing the plans. Other evidence adduced by the plaintiffs tended to show that the rector had express authority to give directions, or, if he had no express authority, had an incidental authority as president of the vestry, or, in default of either form of authority, the church was bound to pay them because the vestry ratified what the rector had done after learning of it. The evidence on the first trial regarding the rector's express authority in the matter of the preparation of plans and specifications consisted chiefly of the testimony of the secretary of the vestry, who swore that at a vestry meeting, when the rector was authorized to sign a contract employing the plaintiffs, one or two members of the vestry told the rector that he was given full authority to act for the vestry in all business connected with the erection of the new church, and to conduct it as he thought fit. The court then held that the rector gathered this impression from isolated remarks made by the vestrymen after the adjournment of the meeting, and that there was an absence of evidence going to show that a majority of the vestrymen had assented at any time, while in session, to the rector's directing the architects. After that appeal was disposed of one of the original plaintiffs assigned his interest in the demand to his partner, who instituted the present action to recover the fees claimed by the firm. On the new trial the secretary of the vestry varied his testimony, swearing that the statement made by one or two of the vestrymen to the rector regarding his authority to control the preparation of plans and specifications was made during a meeting of the vestry, in the presence and hearing of all the members. The sole issue on the second trial was whether the vestrymen, during the session, did, as a whole, authorize the rector to look after the preparation of the plans. The jury found in the affirmative, and returned a verdict for $3,092.50. The defendants appealed. The court held the question was one for the jury. They also held that a formal resolution was not essential to clothe the president of vestrymen and rector with the requisite authority to act as agent of the vestry. Oral authority from the majority of the members, given during a session of the body, was sufficient, and the announcement to the rector of the extent of his authority by one or more members in the hearing of the others, who expressed no dissent, was evidence of what his authority was.

Under these circumstances the court held that the vestrymen had no right to reject the plans in the event of their being dissatisfied with them. While the vestry had the right to reject the plans under the written contract, if they were not satisfactory, as, instead of exercising its right thereunder, it had chosen to delegate authority in the matter to an agent whom the architect obeyed, the corporation was bound by the agent's actions.

In connection with these cases it may be desirable to state here the chief points of the decisions in two recent cases, one in the Federal Courts and the other in the New York Appellate Division, both of which decided, but in slightly different fashion, the points of *quantum meruit* and delegation of authority to contract. The first of these in point of date is Kinney *vs.* Manitowoc County, Wisconsin, decided January 10, 1905, 135 *"Federal Reporter,"* 491. There a County Board by resolution authorized a committee to investigate and make recommendations for the construction of a new court-house, and instructed them to give a report in writing, together with plans and specifications. Acting upon this authority, the committee entered into a contract with the plaintiffs, a firm of architects, for the preparation of seven sets of working-plans and specifications for a court-house. The architects furnished four sets of plans, claiming that these were sufficient to enable a contractor to bid on the building. When these plans were submitted to the board by the committee, the board rejected the plans without stating a reason, and the architects brought an action on the written contract and for a *quantum valebat.* The court held that the committee had no authority under the resolution of the board to employ architects to prepare "working-plans and specifications," and that the words "plans and specifications" in the resolution merely meant preliminary plans and specifications which were not to be paid for.

The resolution of the board also recognized the desirability of a court-house at a cost not exceeding $100,000. The contract sued on called for a building to cost $100,000, exclusive of heating and plumbing, and the agreed-on commission of 3½ per cent. was based on a building of such a value. It was also beyond the power of the committee to make such an exception not named in the resolution, the plans themselves indicating that the court-house would not be a finished structure without the inclusion of the heating and plumbing appliances, and a contract for the plans of a building which would cost materially more than $100,000 to finish was beyond the power of the committee to make.

Again, the resolution required the committee to submit plans by April 1, 1903. The contract entered into by the committee called for plans and specifications to be completed on or before April 21, 1903. This extension of time was beyond the power of the committee to make. Lastly, the plaintiffs in furnishing only four sets of plans and specifications, which failed in many particulars to give such detailed drawings and specifications as were required for a builder's guidance, did not perform their contract and could not recover thereon.

The plaintiffs also sued for the value of the use of the plans and specifications furnished. The court held, however, that as they were not used in the erection of the building, and no use of them by the board was shown, added to which there was an absolute want of proof of the fair value of any use made of the plans even if the county could be charged with their use as enabling them to abandon the project of erecting a building, the plaintiffs could not recover on this account.

In many respects this case is similar to the case of Horgan & Slattery *vs.* City of New York (July 12, 1906), 100 New York *"Supplement"* 68, the chief points of which it may be well to recount here. In regard to the question of delegation of authority to contract, it was held in the Horgan & Slattery case that the Armory Board of the City of New York had no authority to bind the city for architect's fees incurred before it had been authorized to do so by resolution of the Commissioner of the Sinking Fund. Second, the architect contracted with the Armory Board to draft plans for the construction of an armory which would not cost more than $450,000. The plans and specifications furnished were for a building to cost materially more than that sum, therefore there was not such a substantial performance of the contract as to entitle the architect to recover.

On the ground of recovery for a *quantum meruit,* however, the case resulted somewhat differently from that of Kinney *vs.* Manitowoc County. The court said that it was necessary for the Armory Board to obtain accurate informaiton with respect to the kind of armory that should be erected, and that the plaintiffs had done a large amount of work in elaborating the ideas of the Armory Board with respect to the proposed armory, and finally by their labors demonstrated that the building could not be erected within the sum provided, the armory in the end being erected on new plans obtained from other architects at about the cost called for by the plaintiff's plans. The plaintiff, therefore, was entitled to recover upon a *quantum meruit* for the actual value of the services in fact performed.

Another case of implied obligation to pay for an architect's services was decided about the same time in the Court of Appeals of Texas, namely, Buckler *vs.* Kneezell, 91 *"Southwestern Reporter,"* 367 (December 6, 1905). The action was by an architect against the executrix of a decedent for his fees for plans and specifications for various buildings. The petition alleged that, in accordance with the deceased's directions, the plaintiff had prepared complete plans, drawings, blue-prints, specifications and details for a three-story building to be erected by the deceased, the estimated cost of which was $40,000. The defendant claimed that the plans, etc., furnished, called for a building, the estimated cost of which was $50,000, which was $10,000 in excess of the amount that the plaintiff alleged the building he was employed to make plans for was to cost. The court, deciding in favor of the architect for the amount claimed by him, said that there was in the plaintiff's petition "no allegation of an understanding that the cost of the building was to be limited to any sum, or the work of the architect conditioned on the building not exceeding a cost of $40,000. Proof that the building had cost $50,000 would not militate against the plaintiff's recovery on the basis of a less sum, if, as alleged, the plans, etc., that were made were prepared at the instance and in accordance with the directions of Mr. Buckler. So far as the briefs disclosed, there was no evidence that the latter ordered or directed the making of plans, etc., that should not exceed $40,000, or that the cost of the building had anything to do with the matter; and all that is referred to us doing this is the said allegation in the petition. The testimony, outside of any testimony of plaintiff, was sufficient to show that the plans, etc., were made at the instance and by direction of Mr. Buckler, and were at his disposal, and this was sufficient to raise an implied obligation to pay for the services." In this case it is to be noted that there was no evidence that the architect was bound down to furnish plans, etc., for a building which was not to exceed $40,000.

In Evans *vs.* Philadelphia Bourse, Pennsylvania Supreme Court (May 14, 1906), 64 *"Atlantic Reporter,"* 463, where verdict and judgment had been given for the plaintiffs in the court below for $17,520 for architect's fees, there was evidence from which it might be inferred that the parties treated the drawings furnished as those stipulated for, and the court held that that was a matter for the jury. They accordingly affirmed the judgment.

A GERMAN AUTHORITY ON GERMAN AND AMERICAN ARCHITECTURE.

DURING the ceremonial meetings that characterized the opening of the enlarged Carnegie Institute at Pittsburgh a fortnight ago, Herr Ernst E. von Ihnen, court architect to the Kaiser Wilhelm, read a paper on "The Development of Architectural Style in Germany." In part, he said:

"IT is with great diffidence that I venture to lay before you some views of my own on the modern development of architecture in Germany, feeling that as it is not possible to give a comprehensive survey of the domain in question I must be content to submit to you my conclusions without enabling you to judge whether they are sufficiently supported by facts. I am encouraged, however, by the belief that it may be of interest to hear upon this subject the opinions not of an art historian but of an architect who has himself passed through some of the phases of modern architecture and who has felt the influences that have led to many of its changes.

"Now, the future of architecture as a fine art is inseparably bound up with the vexed question of architectural style, and with regard to the development of style a review of what the past century has produced would not at the first glance seem to encourage a very bright outlook on the future. There is no doubt that much of the best artistic power of the nineteenth century was wasted in fruitless search for style in architecture and the industrial arts adapted to the age. Though the great inventions of that century brought about a more rapid and frequent interchange of thought between nations than was ever possible before, we have seen in our own time, as a consequence of these fruitless endeavors, a greater diversity in the architectural aspect of Europe than there was at the beginning of the eighteenth century. No one country has been able to establish an acknowledged supremacy in architecture, as when France at the commencement of the Gothic period, Italy during the Renaissance, and France again in the eighteenth century took the lead and was more or less closely followed by the rest of Europe, nor does at present any such supremacy seem to be in prospect.

"It seems strange, indeed, that a century which has contributed more than any other in the world's history to the advancement of science and which has been so fruitful in inventions that have immeasurably increased the wealth and power of mankind, should have been stricken with barrenness in this one domain of architectural inventiveness. We architects are accustomed to be asked reproachfully why our age has produced no style of its own, as former periods have done, and we are often told that our art has fallen from its high estate and that the best among us have sunk to the part of more or less conscientious copyists. In my opinion this reproach is unjust, and the chaotic state of modern architecture may be accounted for without assuming that our architects have been lacking in the inventive qualities possessed by former times. The unsatisfactory state of things in the nineteenth century has been brought about by two causes. First, by the destruction of an ancient society and an old accumulation of wealth by the French revolution and the Napoleonic wars, and, secondly, by the sudden growth of a new society and new wealth acquired for the world by the introduction of steam-power and the inventions which followed in the wake of this great innovation, bringing about a sudden demand after a long standstill—a demand to which the artistic inventiveness of no age would probably have been equal under the given conditions.

"At the commencement of his reign, his majesty decided that the buildings to be newly erected in Berlin for the Crown and for the State should be designed in a style harmonizing with the noble architecture of the Royal Palace and of the Arsenal.

"Not only the designs for these buildings, but all those of great importance, for all departments of the State are now regularly submitted for his approval and are influenced by his wishes. Continuity of effort I believe to be the principal condition of progress in architecture, and I consider my country to be most particularly fortunate in possessing in this critical period a far-seeing patron of art so powerful as to insure steadiness of purpose, as far as monumental architecture is concerned.

"It is therefore a hopeful view that I take of the future development of German architecture, and there can be no doubt that in Germany the misfortunes that caused artistic decline in the nineteenth century had a more disastrous effect than in any other country, for none had suffered so severely from the great European wars in England and France. Political unity has brought about greater artistic unity. As far as I am able to judge, the development of style in both countries has been following lines almost parallel to our own, the result of a century's trial given to different styles being a decided leaning towards the Classical architecture of the eighteenth century based, as with us, on a more complete understanding of that style, and, therefore, on a greater mastery of the possibility of a greater freedom of treatment than ever nineteenth-century architects attained to who attempted to work in the style of a former period.

"I may sum up my argument by saying that in my opinion there has been in the history of architecture a progressive, though sometimes interrupted, development of style as an expression of the architectural requirements of society from the fifteenth century up to the nineteenth, and that in order to progress still further we must start from an advanced point that had been reached before the continuity of progress was interrupted. Yet if we would not stand still we must constantly work at the adaptation of old means to new wants which have arisen and are arising in our time. In domestic architecture much has been done in this respect, especially in England, and of late years in Germany But in no country is progress more likely to be brought about in this way than in the United States, where architects have already shown themselves well able to grapple with new architectural problems arising from new requirements, as in your admirable libraries, or from new methods of construction, as in your giant commercial buildings, and when the opportunities offered to architects are more frequent and the means at their disposal greater than in any country or in any age. The advancement of art has always been promoted by the peaceful rivalry of nations, and I therefore feel sure that the art of European countries can only gain by our finding, as we certainly shall, in the United States of America, a competitor as formidable in the domain of art as they are in commerce and in industry."

Later, in New York, he expressed himself as follows to a *New York Times* reporter on the kindred topic of architectural development in this country:

"I see the greatest hope for a magnificent architectural future for America. You are at work meeting conditions. That is the thing that architects have always to do. No nation can achieve a national architecture whose artists say: 'Let us build in the Gothic style,' or, 'No, let us build in Romanesque; that is better.' A country has simply to begin and build; it will start with what style it believes best suited to its particular problems, but it will develop just as it appreciates its needs. I have my idea as to what historic style is best suited to be the foundation of your architecture, but you may find another to be the best one. That doesn't matter. The point I make now is that you in America are earnestly striving to meet the particular problems of buildings fitted for dwellings, business houses, and public halls in America—problems different in many respects from any hitherto attacked by architects—and you are meeting these problems with a surprising degree of success, considering how brief has been the time during which you have been at it.

"New York is most impressive in the daring and untrammeled spirit in which it is thrusting up its gigantic fabrics into the air. Consider, whoever before undertook to erect what is almost a city under a single roof on such a plot of ground as that on which stands that 'Flatiron Building.' And how brilliantly you have dealt with a similar problem in *The Times* Building.

"You do right, precisely right, to treat these tall buildings frankly as towers. That is exactly what they are. Already you have the campanile of Giotto standing in the most conspicuous point along your thoroughfare, and, I believe, other great towers reproduced in other parts of the city.

"Your problem has been to make the most of every inch of land. The concentration of the people in the city has brought conditions from which architects of former years have been free.

"I must say that I believe that the limits of high buildings will soon be reached and that their multiplication will soon cease. You are closer, possibly, than you think to the point at which it will be impossible to transport more people to and from their work. It is all very well to have these immense towers here and there, and perhaps gathered in considerable number in some parts of a town. But if the streets are to become great canyons lined with solid blocks of towers, it will be eventually impossible to get their inhabitants in and out. Then the question of daylight will be one incapable of solution. You will, I think, find it advisable and necessary to limit the height of buildings, as we do generally in Europe.

"But to return to the question of style. People often ask why we have no style to-day, why we are all adrift as to the most elementary principles of the art, and reveal so often the most execrable taste.

"The reason, I believe, is this: Until within the last few years architecture has had no chance. The nineteenth century was one of war and of disturbed social and political conditions and of general poverty. All the arts suffered, and especially did those which require large outlay suffer. Not only were no great buildings erected, but men forgot how to build, and when we began again it was in ignorance and forgetfulness. The result was the horrible warnings which exist on every side. If only the tradition of good building had been remembered we should have been spared all that.

"Now that we are prosperous again and minded to build, we shall do well if we go back to the eighteenth century and begin again where architects left off. Why begin at the beginning? Why puzzle again over the problems which earlier centuries have definitely settled? I consider that there are certain things pretty well determined in architecture. The sixteenth century definitely discarded Gothic as a style for domestic or commercial architecture. Conditions of life have altered since the days when Gothic was properly employed, and it is mere slavish imitation to build in it now. I do not speak of ecclesiastical architecture. Religion is essentially unchanging, and its aspirations express themselves in forms permanent and stretching from age to age. But domestic life is not to-day what it was in the Middle Ages, and commercial life in its modern sense is a new thing in the world.

"My belief is that the world was right in agreeing, as it did. that the Classic form was the one which might best be progressively adapted to the needs of modern life. In the eighteenth century it had reached the highest development, for its purpose, of the Classical style. My feeling is that we are wise in going back to that point, not to rest in its achievement, but to progress from it, having in mind always the necessity of studying our particular problem and in dealing with it freely and creatively, yet with intelligence informed of the history of past architectural endeavor.

"The information is acquired. The creative spirit is more a native gift. It is the evidences of it that fill me with confidence that great architectural triumphs will be wrought in this land of the West.

"In my opinion there has been in the history of architecture a progressive, though sometimes interrupted, development of style as an expression of the architectural requirements of society, and in order to progress still farther we must start from an advanced point that had been reached before the continuity of progress was interrupted. Yet, if we would not stand still, we must constantly work at the adaptation of old means to new wants which have arisen and are arising in our time. In domestic architecture much has been done in this respect, especially in England, and of late years in Germany.

"But in no other country is progress more likely to be brought about in this way than in the United States, where architects have already shown themselves well able to grapple with new architectural problems arising from new requirements, as in your admirable libraries, or from new methods of construction, as in your giant commercial buildings, and when the opportunities offered to architects are more frequent and the means at their disposal greater than in any country or in any age. The advancement of art has always been promoted by the peaceful rivalry of nations, and I therefore feel sure that the art of European

countries can only gain by our finding, as we certainly shall in the United States of America, a competitor as formidable in the domain of art as they are in commerce and in industry."

SOME ENGINEERING LESSONS OF THE SAN FRANCISCO DISASTER.[1]

THE modern city is the creation of commercial needs, and its location is fixed by commercial conditions. The duty of the structural engineer is to so plan all parts of the structure that it shall resist (1) with certainty all definite calls upon it; (2) with no serious injury all probable calls upon it; (3) and without destruction all those occasional visitations that human power can resist. Grouped under the first heading are the live-load, dead-load and the ordinary wind-load requirements, etc.; under the second heading would be grouped such occasional attacks as those of fire, gales and moderate earthquakes in earthquake regions; under the third head occur such disasters as hurricanes and tornadoes, general conflagrations and severe earthquakes, such as at times appall humanity in disasters that are made possible by reason of inadequate design or construction (or both), permitted in order to save a small percentage of expense, but thereby hazarding the integrity of all, with the gambler's chance of some gain or great loss.

Successful resistance to earthquakes, even when severe, is possible; but as this concerns most cities only remotely, it will be passed over with the statement that unified foundations structurally carried to solid material, with a thorough sway-bracing of the frame, will preserve the integrity of a steel building in any probable earthquake; even in masonry walls, bands of metal reduce to small proportions the damage to them from seismic disturbances. It is mainly with the fire lessons that we are concerned, because they are of universal interest and application. It is true that, often when discussing these lessons, we hear the remark that the Baltimore and other fires teach the same facts; but if we analyze more deeply, we must conclude that the San Francisco lessons are unique in giving us generally the effects of fire only, while nearly all others have left the added destructive action of water and steam upon the highly-heated fire-resisting materials.

The main study, then, will be that of different engineering materials with regard to their earthquake-resisting and fire-resisting properties. In view of the general conditions found to exist in San Francisco, as developed by his careful inspection of the city, the writer would impress with all the earnestness at his command the absolute necessity that good construction must follow a good design, or the result is a failure. Faulty design may be partly or wholly redeemed by excellent construction, but a thoroughly good design may easily be utterly ruined by defective construction. These facts are not at all new, but they are so evidently often obscured or ignored that it would be well if they might be impressed with all the vividness of a new thing. The engineer should always see to it that his design is constructed of adequately good materials and executed with the necessary skill and character of workmanship.

Passing the discussion of foundations (not because they are less important than any, but because the superstructure is most exposed to the destructive agencies under discussion), it may be said that wood resists earthquake vibrations well, if the frame and roof are properly tied and braced; the almost universal practice is to ignore such bracing, and then the result is a collapse. In fire, wood, of course, "adds fuel to the flames." Masonry walls of all kinds resist the earthquake usually without destruction if well built, generally with considerable damage; the effectiveness of resistance is enormously increased with but little extra expense by improving the weak part of the wall—the mortar—by putting into the mortar a large proportion of Portland cement[2]; and a further effectiveness of resistance may be secured by metal ties and bands. Against fire, even without the rupturing and exploding action of water from the fire streams striking the highly-heated materials. stone of practically all varieties spalled and disintegrated badly and in varying degrees, enough to require its replacing for the sake of appearance even when it was not structurally incapacitated.

[1]A paper by J. L. Van Ornum, read before Engineers' Club of St. Louis, and published in the "Journal" of the Association of Engineering Societies for March.

[2]The Appraisers' Building, which survived without a crack, was built with brick laid in cement mortar, and is said to have had a monolithic concrete foundation six feet thick capping the foundation piles.

In buildings in which steel enters as an essential structural element, more attention must be given to lateral bracing and to connections to make the structure safely resistant to earthquake vibrations. A more definite lateral stability must be furnished, with less reliance upon the indefinite internal rigidity of the finished structure.

In fire, the particularly vulnerable point of buildings of the first class remains the inadequate protection usually made against the introduction of fire from the outside, through windows, doors and inadequately designed roofs which quickly burned away. The protecting effect of metal shutters and metal covering of window trim was great, increasingly so as its character was better, and often so decisively effective as to permit the saving of the building at critical times, as the Kohl Building. Even without such protection the decided advantage of wire-glass was shown in a number of cases, as that of the Western Electric Company's Building. Although the heat shatters the glass, the wire holds the pieces in place in most instances, so that the flame cannot enter; and although it has the defect of diathermancy, even a weak defense inside may overcome the danger arising from the transmitted heat. It has become evident that, in general conflagrations, fireproof buildings are the innocent victims of outside attack rather than the cause. The conclusion is then inevitable that a very great need in improving conditions is adequate protection of exterior openings.

Passing without comment some of the lessons driven home by resulting failures, such as the necessity of adequate and correct connections, thoroughly good riveting, good bond between facing and backing, properly constructed partitions, etc., the general fact is noted that terra-cotta offers much less effective resistance to fire than does reinforced concrete. I can tarry on this lesson only long enough to state that this reference is, of course, only to good materials, well fabricated; and in this connection it should also be stated that critical examinations have indicated grave danger of the gradual scattering corrosion of metal embedded in cinder concrete.

There probably is no more important or instructive lesson to be drawn from this disaster than the imperative necessity of adequate protection of essential metal, whether this metal be a steel frame or steel reinforcement of concrete construction; and a considerable advance has been made in determining with much greater definiteness the details of such requirements. San Francisco's revised building laws, as approved on July 5, 1906, permit of the use of brick, metal-lath and plaster, terra-cotta and concrete. Brick of proper quality furnishes good protection if the minimum covering of the most exposed metal is at least four inches, and the mortar is of Portland cement. Metal-lath and plaster may, with care, be made efficient, but the wisdom of its permissive use seems to the writer to be doubtful, because the requirements for efficient resistance are so easily slighted; the fact remains that a noticeable proportion of failures in San Francisco were due to a sham application of this kind of protection.

When terra-cotta is used, the minimum protection should be at least two inches for beams and girders and four inches for columns, with especial attention given to proper mortar and to metal ties. It must also be remembered that, where the heat is great, the outer web of terra-cotta blocks shears off and fails, due to the excessive differential expansion of this outside web even when water from fire streams does not add its rupturing effects by cooling suddenly the highly heated surfaces; this usually means the preservation of the integrity of the steel frame, but does necessitate an entire reconstruction and replacement of the ruptured terra-cotta.

Concrete or reinforced-concrete of good quality both protected the structural metal and usually avoided the necessity of reconstruction (because the injury to it was superficial, not radical), except when the thickness of this protection was insufficient. In cases where the embedded, protected steel reached within an inch or so of the surface, the fire conditions often ruptured off the thin protecting layer of concrete, leaving the steel exposed. This is especially liable to occur on the under side of floor-beams and girders, where the embedded rods are so near the surface that the highly heated covering differentially expands considerably as compared with the concrete above the steel, leaving an easily ruptured section in the plane of the reinforcement where the bars are so numerous as to greatly reduce the area between them of the concrete connecting this outer protecting layer with the mass of concrete above the reinforcing steel.

It is believed that three or four inches of covering for the metal is as necessary for reinforced concrete construction as for column coverings of brick or terra-cotta in order to give columns adequate fire-protection. Tending to confirm this opinion is the fact that as a general proposition, in a temperature of 1,200 to 1,500 degrees Fahr., heat will penetrate concrete to a depth of two inches, enough to raise its temperature to 500 degrees Fahr. in less than an hour, while it takes perhaps three hours for this temperature to penetrate four inches; this is significant because noticeable loss in strength occurs at about this temperature, which increases rapidly for higher temperatures. For evident reasons the regulation of the item just mentioned must be covered by the building laws of cities in order that it may be made effective, as in the case of so many general requirements necessary for the public safety and welfare.

Hitherto it has been considered that a point of especial vulnerability is the lower flanges of beams and girders. While this fact essentially remains true, it seems that, relatively, more attention must be given to the adequate protection of columns, inasmuch as the failure of one of the lower columns involves not only the loss of it, but also the letting down or destruction of everything above it. The most prevailing cause of destruction and loss in the San Francisco fire, caused by a single class of weakness developing, was due to the partial or complete failure of basement or lower-story columns exposed to the fire by the destruction of their fireproofing.

I would add, in closing, one reference that concerns engineering in its commercial and business relations. The adequate protection of essential members from fire will add a small per cent. to the cost of a building over its cost if partially protected. This amounts to a few thousand dollars, which looks large to the firm paying for the structure; consequently, as a rule, the firm will take the risk of destruction for the sake of saving this extra initial expense. Were the small additional expense of thorough fireproofing assumed, it would not only decrease the hazard to the owner, but would make the structure a safer risk to insurance companies. Unfortunately, fire-insurance companies will not make public such statistics as they have, giving relative losses on different types of buildings. Yet it is believed that their relative losses on buildings of the first class are much less, proportionally, than is indicated by the somewhat lower insurance rate now prevailing for such buildings. In other words, the reduced hazard secured by thorough fireproofing and fire-protection ought to secure to the owner an insurance rate so noticeably lower that this saving would go far toward compensating him for the extra expense in securing this increased safety. This reduction in rates might well be made still greater when fireproofed buildings are compactly grouped, thus mutually protecting one another. Engineers, architects, insurance men and men of business would probably find that united consideration of this subject would lead to a mutually beneficial adjustment of these interests on the lines indicated.

ILLUSTRATIONS

ALL SAINTS' CATHEDRAL FROM THE SOUTHEAST, ALBANY, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

HOUSE ON SOLDIERS' PLACE, BUFFALO, N. Y. MR. W. A. SCHOLLE, ARCHITECT, BUFFALO, N. Y.

HOUSE OF MRS. STETSON, 3 WEST 96TH ST., NEW YORK, N. Y. MESSRS. HUNT & HUNT, ARCHITECTS.

NEW YORK MEDICAL COLLEGE AND HOSPITAL FOR WOMEN, WEST 101ST STREET, NEW YORK, N. Y. MR. W. B. TUTHILL, ARCHITECT, NEW YORK, N. Y.

NO. 48 DORCHESTER ROAD, MR. GEORGE F. TOWNSEND, DESIGNER, AND HOUSE OF MR. DUBOLD, LINCOLN PARKWAY, BUFFALO, N. Y., MESSRS. LANSING & BEIERL, ARCHITECTS, BUFFALO, N. Y.

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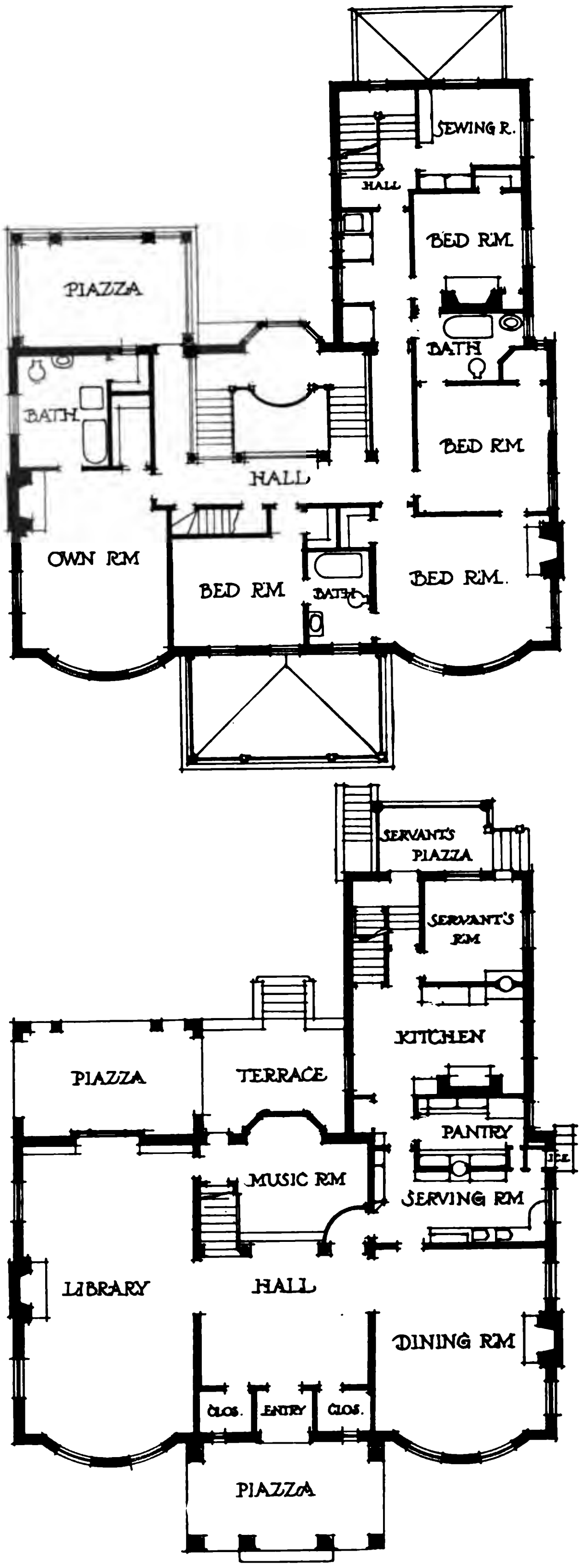

Additional Illustrations in the International Edition.

DIE PFALZ, NEAR CAUB, PRUSSIA.

These subjects are copied from *Blätter für Architektur.*

MONUMENT TO THE BROTHERS CAIROLI, ON THE PINCIO, ROME, ITALY, ERCOLE ROSA, SCULPTOR.

BRONZED LEAD VASE, BASSIN DE NEPTUNE, VERSAILLES, FRANCE, AND THE GARDEN FROM THE PASHA'S PALACE, TETUAN, MOROCCO.

INTERIOR VIEWS IN THE BARDO MUSEUM, ALGIERS, ALGERIA,

NOTES AND CLIPPINGS

THE SOUTH AFRICAN TEMPLES.—The temple ruins at Rhodesia are puzzlers. The erudite folk used to say they were ancient, but Dr. Randall Macivers, their latest explorer, says they were built in the Middle Ages. He says the great "Elliptical Temple" was the fortified residence of the great chief or Monomortapa, whose sway extended over an enormous area and an extensive population. To understand how architectural feats like the finer Rhodesian buildings can have been achieved by the precursors of the modern South African natives, it is necessary to assume that in those days there was organization of a far higher character than has obtained in recent years, organization under great chiefs whose power and intelligence were of a relatively high order. From the Portuguese and their records this would appear to have been the case in the days of the Monomortapan empire of the Middle Ages down to the close of the sixteenth century. The organization of labor implied by the elaborate and decorated stone architecture is remarkable. Even more remarkable than the fortified castles are the terrace walls. These stone-built walls form irregular concentric rings around the hills upon which the villages were situated, and although structurally simple, cover an enormous area, extending in close formation over a space of upward of fifty square miles.—*Chicago Tribune.*

A SCOTTISH JUDGE ON THE ARCHITECT.—Lord Cockburn, in his *"Memorials of my Time,"* when referring to certain difficulties which attend the man who devotes himself to the planning and erection of buildings, said: "An architect is almost the only professional man who can never be rightly judged of by the works which he executes. His art is costly, and each part is fixed as soon as it is done. There is no rubbing out. This would be severe, even were he allowed to have his own way. But how often does it happen that he is thwarted by position, poverty, or obstinate ignorance! He must perpetually sacrifice his taste to suit the humors and the purse of his employer. Yet nothing is so common as to hear an architect condemned on the mere sight of a work against every defect of which he has protested. Painters do not paint, nor do poets write, on these terms."

MME. MUSARD'S STABLE.—In M. Frédéric Loliér's *"La Fête Impériale"* one finds the strange Odyssey of that wideawake, ambitious and pretty American girl, Eliza Parker, born in a modest town on the Ohio River, who came to Europe and won the heart of the austere King William III. of Holland. One day the aged sovereign drew from his writing-table a package of old mortgages on some lands in Pennsylvania, and gave them as a souvenir to the fair Eliza, whose business instincts were so keen that she forthwith foreclosed the mortgages, and thereby possessed herself of one of the most valuable petroleum deposits in the world. The fair young Ohio beauty thus became one of the richest women in Europe, and without even going through the formality of separating herself from her official husband, a violinist named Musard, she came to Paris. She purchased a sumptuous hôtel, built palatial stables for her eighty magnificent horses and entertained lavishly. Mme. Musard, at a dinner that she gave in honor of the Prince de Chimay, wore a dress embroidered with over three thousand pearls. Tickets were issued to persons desirous of visiting her stables, which were finer than anything of the kind ever before seen in Paris. Among those who were frequent guests at breakfasts given in Mme. Musard's stables were Arsène Houssaye, Théophile Gautier and the painters Chaplin and Zeim. The table service at these repasts was performed, alternately with each course, by three coal-black negroes and by three white men. These attendants wore velvet knee-breeches, white silk stockings, shoes with silver buckles, and powdered wigs. Mme. Musard's equipages were more magnificent than those of the Empress Eugénie.—*C. I. B. in N. Y. Tribune.*

THE PRESERVATION OF ITALIAN ANTIQUITIES.—Writing about archæological schemes in Italy, the correspondent in Rome of the London *Times* says that Italians feel that Professor Rava, the new Minister of Instruction, will carefully guard the national interests in all antiquities. He has conceived a vast programme, and has obtained from the premier the means to execute it. He began by choosing Prof. Corrado Ricci, considered the most competent person in Italy, as Director-general of Antiquities and Fine Arts. He then presented a bill for the protection of antiquities and art treasures, with an initial fund of $1,000,000, for the purchase of those still belonging to private individuals. He has also presented a bill for the institution of special offices for monuments, excavations, and fine arts in all the provinces of Italy. Up to the present, in the whole south of Italy, there has been only one such office—namely, in Naples. He has doubled the appropriation for excavations and increased the sum expended for antiquities and fine arts yearly. He has ordered the beginning on a large scale of excavations at Ostia, the port of ancient Rome, which it is hoped will be finished, or much advanced, in 1911, for the celebration of the fortieth anniversary of the proclamation of Rome as the capital of Italy. Besides this he has ordered excavations at Pæstum to find the remains of the great edifices of which Greek and Roman historians have spoken, besides the three magnificent Doric temples still standing. He has obtained permission to expropriate all the houses surrounding the Baths of Diocletian. Finally, he has obtained $1,200,000 for the construction of the much-talked-of Archæological Promenade, which is to be finished within three years. It will start from the Roman Forum, and will pass by the Colosseum, going as far as the Baths of Caracalla on one side and the Baths of Titus and Trajan on the other. —*N. Y. Evening Post.*

NEW DISCOVERY ON THE PALATINE HILL.—While celebrating the 2,660th anniversary of Rome, the founding of which is supposed to have taken place April 21, in the year 753 B.C., an important discovery was made on Palatine Hill. While trying to determine the entrance to the Palatine Acropolis and also to explore the Necropolis, a circular ditch was found, evidently a pit or tomb. It is similar to those discovered in the Roman Forum, and is believed to be connected with the earliest habitation and to have been constructed by the founders of the Palatine stronghold, as it is known the Acropolis was reserved for the leaders in Palatine and that the tombs surrounding it within the second range of fortified walls were only for the burial of patrician families. Minister of Instruction Rava has visited the spot and ordered a continuation of the excavations.—*Exchange.*

EXPLOSIONS BENEATH ROADWAYS.—An interesting case of the production of a liquid alloy of potassium and sodium by the action of electricity escaping from a defective cable beneath a roadway was recently discussed by Dr. Bassett before the Society of Chemical Industry. The cable was supplying power to a motor at 460 volts, and the current was carried by two thick, insulated copper cables, one positive and the other negative. These were laid about an inch apart on wooden bridges, in a wooden trough, which was then filled with bitumen. Only the negative cable was affected, and the leakage occurred at a spot where two parts of the cable had been joined. Investigation by Dr. Bassett showed that the alloy was formed by electrolysis of water containing potassium and sodium salts, which had come within the range of influence of the electricity escaping from the defective cable. A considerable amount of hydrogen in the gaseous form must have been formed at the same time. The alloy when brought in contact with water emitted small flames, due to the decomposition of water and ignition of the liberated hydrogen. Dr. Bassett suggests that many of the explosions which have occurred in the neighborhood of electric-light mains, and which have been attributed to accumulations of coal gas, have been due to accumulations of hydrogen formed by electrolysis. Ignition of the explosive mixture of hydrogen and air may occur in the absence of an electric spark or a match, if potassium or sodium, or an alloy of these two metals, has been produced by electrolysis.—*The Builder.*

"THE CROOKED HOUSE."—On the estate of Earl Dudley, at Himley Staffs, there is a curious habitation known as "the crooked house." It is altogether out of the perpendicular and slants toward the south end, which is heavily shored up with thick red brick buttresses. These peculiarities are the result of mining operations, the under stratum of the earth in these parts being completely honeycombed. The clocks on the walls, although absolutely perpendicular, as their pendulums testify, appear to be hanging sideways at a pronounced angle. A short glass shelf, one end of which appears to be a foot higher than the other, proves to be absolutely level, while in the tap-room is a table which is apparently slanting, but on which if round marbles are placed at the seemingly lower end they roll to all appearances up-hill to the top of the table and fall over with a bump.—*Exchange.*

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NOTES AND CLIPPINGS.
SOCIETIES, PERSONAL MENTION, ETC.

ANNOUNCEMENT.

THE publishers of the *American Architect* feel themselves indebted to architects the whole country over for the measure of success gained in the past two years through their recognition of the value of the improvements that have been effected in the publication. In order to be in a position to continue these improvements and at the same time to attain the full business success which it is justifiable to expect, it has been thought wise to make important additions, particularly to the business staff, and to move to more commodious quarters in the Flatiron Building. The actual date of removal will soon be announced.

Mr. H. M. Swetland, president of *The Automobile,* Mr. G. E. Sly, formerly with *Power,* and Mr. J. T. Morris, of the *Municipal Journal and Engineer,* have acquired an interest and become directors. The ownership is now vested in the Swetland Publishing Company, of which H. M. Swetland is president, G. E. Sly and M. C. Robbins, vice-presidents, F. P. Burt, secretary, and J. T. Morris, treasurer.

FOR very many months the columns of the real-estate and building journals have teemed with announcements that "a reinforced concrete building was to be erected for Mr. Suchanone by Messrs. So & So, architects," and a good many people who like to be pessimistic have been plunged in a cheerful gloom when, in their mind's eye, they beheld all sorts of architectural enormities being carried out in unalterable forms after this newest of methods. But pessimists are not the only ones who are awaiting, with quite as much dread as impatience, to discover whether the early experimenters are going to discover and disclose the fact that the modern designers can evolve an individual and artistic expression which will signify to the onlooker that the building is of concrete as clearly as that other buildings are made up of brick, stone, wood or iron, or whether they have discovered for it only forms so gross and crude that it is obvious that the new method can hardly be accepted in good society, as it were, but can be used only for those buildings and sites where "beauty doesn't count." We know our readers will turn with much interest to the illustrations we have gathered for this issue, and we have a fancy that most will turn from them with a mixed feeling of disappointment and relief. If there is little here that declares itself to be concrete, so disguised is the substance of the building with veneerings of brick, stone or terra-cotta, yet it is a real relief to find that so many architects feel that, building being an expensive operation, they have not the right at present to use their clients' money in dubious experimentation at large scale.

THERE may be found elsewhere in this issue the contributed opinions of many architects as to what should, and may, be the proper artistic expression of a concrete building unveneered in any way, and we will not detract from the freshness of any of them by undertaking in this place to sift, compare and summarize the views expressed. The matter deserves the attention of every one, even of the busiest man or the man, mentally indolent, who likes to have his ideas predigested. But there are one or two points we think well to lay stress upon. In the first place, for buildings where beauty is expected to count, we think that the idea that reinforced-

concrete building methods are invariably going to prove more economical in first cost than any others should be abandoned. And this advice is all the more sound if the designer, remembering that concrete is a plastic material, undertakes to express this fact in his design by indulging in the use of fictile lines and contours, lines and forms that at the present are rather the tools of trade of those who affect the "Art Nouveau." Of course, if Portland-cement concrete alone is to be used, there is small chance of giving a very telling expression to the plastic nature of the mixture; but if the mixture for the walls be properly tempered so as to set slowly, or if the walls be heavily veneered with stucco or rough-cast, very effective and satisfying fictile expression may be devised. Finally, it must always be kept in mind that concrete, while a serviceable fireproofing mixture, is not itself fireproof, and that in certain positions it must be protected by other fireproofing, whose function it shall be to absorb into itself the inevitable disintegration due to impinging flame—or flame and water in alternation.

ARCHITECTS who do not chance to be afflicted with deafness and so, more than other people, have their lives at the chauffeur's mercy, have better reason than most people to regard with complacency the phenomenal expansion of automobile traffic in this country. It is true that the public records are cumbered with mortgages which show how recklessly men of meagre income have been willing to risk the homes of their wives and children rather than exert themselves to master the lust for speed, and it is true that a mortgagor is not likely to patronize architects. But it is also true that each automobile in the course of its career carries for its owner many guests who have not yet pledged their all for a too-costly vehicle, introducing them to unsuspected chances of home-making in their immediate neighborhood, and stimulating in them the desire that almost every man has to own a place of his own and build upon that place just the sort of dwelling-house that appeals to his domestic needs or æsthetic appreciation. The automobile craze is sure to be the direct cause of putting in the way of the younger architects many a pot-boiler.

THE automobile, moreover, is quite likely to have a very distinct effect on the architectural character of the buildings erected as summer "cottages" by the more wealthy. What do these "hill-climbing contests" mean? What is their use, if it be not, in part, to assure the future country gentleman that he may safely place his house upon a hill-top, no matter how steep the approach or how craggy the site? In the past, many a man, attracted by the situation and enamored of the view, has built an expensive house on a hill-top only to desert it in a year or two, after experience had shown how unendurable was the tedium and waste of time in crawling up-hill in horse-drawn vehicles. But now the automobile makes practically any height a good building site, and with that fact established will come a revival of the discussion of whether in a building designed for such a site horizontal or vertical lines should predominate, whether silhouette or mass should count; and, just as the bicycle-tours through the valley of the Loire had much to do with creating the present fashion for the pseudo French châteaux sprinkled over the American country-side, so we may expect to find the automobile an active agent in the crowning of many a hill-top or craggy bluff with American adaptations of Rhenish castle or French *château fort*. Further, reinforced-concrete methods and materials lend themselves admirably, almost naturally, to the easy reproduction of the brute masses of castellated dwellings, and a contractor who would add heavily to his estimate, if obliged to haul building-stone to a hill-top site, will see that, with such easily divisible loads, and so readily handled, as broken aggregate and cement, he can figure teaming at a lower rate. It may be worth while for architects to be ready to meet a demand for castles, provoked by the ubiquitous excursions of automobile parties.

WE said recently that municipalities which benefited by the labors of Art Commissions valued these bodies in much the same way that they do their school-committees; and, in spite of what has just happened in Boston, we still believe the statement to be true. In Boston, the City Council a week or so ago, in passing the annual appropriation bill, cut the item covering the "office expenses" of the Art Commission from four hundred dollars to one hundred dollars. A peculiar feature of the situation is that the law that establishes the Art Commission directs that money for its "reasonable office expenses" shall be provided annually, and for some years the sum of one thousand dollars was so allotted. But the Commission, finding that this was more than was really needed, asked that only four hundred dollars be appropriated to its use. And now this has been reduced by three-quarters, in order that the City Council may have more funds for the "entertainments" in which the present city administration so likes to indulge.

A GOOD many people have thought it regrettable that Art Commissions have always hitherto been denied the right of initiative—a limitation of powers we trust may be universally observed. But it has occurred to us that a really strong and convinced Art Commission might, on occasion, come very close to being the actual designers, if not the conceivers, of the work they finally approve. All that would be necessary would be that the Commission should treat the authors of the designs submitted to their judgment as Richardson, for instance, treated his draughtsmen, as mere vehicles for registering his own ideas as verbally described and re-described when the first interpretation was found amiss. Of course, the ordinary Art Commission already works somewhat in this way; but, some day, some Commission will discover that it has been possible to effect such important changes—and for the better—that there is neither identity nor similarity between the accepted design and the original one, and then it will be a delicate matter to determine who is really the designer and deserving of applause and credit.

THE ARCHITECTURAL PROBLEM OF CONCRETE.

ONE among the many factors which have brought about the confusion of styles in present-day architecture has been the rapid development of new materials and processes of construction. It is an interesting and in some ways a singular fact that it is harder to change the currents of decorative than of structural design, although one would suppose the first more fluid and easier of alteration than the second, because dependent on the imagination, while building methods are the product of accumulated experience. The truth of the matter, however, is that decorative forms are the product of taste working upon a basis of tradition, while structural processes are largely the products of calculation. To solve in a satisfactory manner the problem of design upon a new structural basis is a more difficult and delicate problem than to design a new form of construction, because a satisfactory solution must meet the demands of a public taste which has been formed largely upon long-accepted canons. No one designer ever invented a successful new style: the styles that have lived have in every case been the results of a gradual evolution. Modern skeleton-construction is nearly twenty years old, but we are still seeking for a truly logical and artistic style of architectural design with which to clothe it. And now we are facing another problem in the adaptation to architectural design of the various systems of construction in concrete.

The three principal systems for the use of concrete are respectively those in which (*a*) it is used merely as a structural core, to be faced with brick, stone, tile or plaster; (*b*) it is moulded into blocks and used like stone or brick; and (*c*) it is used in the mass, being poured and rammed into moulds and presenting, on their removal, the uniform surface of a monolith. It is this last, this monolithic system, which presents to the architect the most difficult and novel problems.

The difficulties in the artistic treatment of monolithic concrete buildings relate to form, texture and color.

It is, of course, comparatively easy to fall back upon the traditions of stone architecture and cast the building in moulds formed upon the familiar elements of design—columns and arches, modillions and brackets, corbels and finials, tracery, pediments, niches, and what not. This is, however, neither logical nor satisfactory; for, apart from the difficulty of producing fine detail with detachable moulds, there is the fundamental objection that the material is wholly unsuited to reproduce many of these forms. Slender mullions and fine arrises in concrete are absurdities. The effects of the chisel upon the carved stone cannot be repeated in the concrete. Its texture and color are not those of stone. In short, the whole category of lithic forms by their character and suggestions belie the process of their production in concrete, and the building so shaped and decorated becomes a contradiction of itself, from top to bottom. Moreover, a lithic treatment forbids some of the most characteristic expressions and uses of the concrete; for one can span an opeinng with a reinforced-concrete beam of a length impossible with a stone lintel.

The nearest analogy to monolithic design in traditional and historic architecture is to be found in the plastered and stuccoed buildings of southern Europe. These present broad, flat surfaces without joints or strong projections, somewhat resembling a concrete wall. The so-called "mission architecture" of the Southwest offers suggestions which should be useful to the designer of a monolithic building. That style depends less upon architectural embellishments, and more upon mass, fenestration and the broad shadows of projecting roofs and deep recesses, than any other with which we are familiar. The plaster surfaces resemble somewhat those of the moulded concrete in general effect. The openings may be square or arched in form, as one may prefer for artistic results. But this style has rather narrow limitations. It would be difficult to adapt it to a huge city hotel or to a tall office-building or huge department-store. The steep roofs desirable in Northern climates do not harmonize with the style. It is evident that in large and complex buildings there must be many experiments and much invention and adaptation before satisfactory results will be secured. It is very easy, with so plastic a material, to throw all restraints of tradition to the four winds, with disastrous results. The extraordinary house of M. Hennebique in the suburbs of Paris may be cited as an example of a perfectly logical but absolutely hideous use of the material. Architectural freaks are not to be desired.

If one may venture a few suggestions based upon theory and not experience, it would seem desirable, in the first place, to insist that the designer must always keep in mind the two fundamental qualities of a moulded concrete edifice: the material is plastic, the building a monolith. Strong projections and the simulation of carving should be avoided in all the decorative detail; on the other hand, the soft and weak effect of too many rounded corners and of formless, "pudgy" swellings is equally undesirable. The strong shades and shadows should be produced by the structural masses and openings rather than by decorative details. But while stonework should not be imitated, and decorative forms peculiar to lithic architecture should be sparingly used unless greatly modified, this does not forbid a free use of suggestions and "inspirations" drawn from the traditional styles, carefully selected and adapted to the new material. The fundamental principles of architectural composition are as valid for concrete as for brick or stone.

The texture and color of concrete in the mass are serious obstacles to its general adoption for exterior architecture. How far these can be modified by coatings of cement specially treated, and by brushings, combings and toolings of the flat surfaces of the exposed concrete, only experiment can prove. But it will always be possible to break up certain parts of the surface, in spots, by panels, or borders, for instance, or by decorative surface-patterns stamped or moulded in the plastic material. Byzantine surface-incision and Moorish wall-decoration offer suggestions. Some of Mr. Louis H. Sullivan's delicate surface ornamentation which has proved so successful in stone and in terra-cotta, might be almost equally effective in concrete, with a little adaptation and simplification. But if concrete is ever to be extensively used in monolithic buildings of monumental size and importance, it will almost certainly not be without the aid of other materials. There is no reason why stone and terra-cotta should not be used for certain features where the contrast of their texture, color and decorative character with the concrete would be desirable. Inlays of ceramic tiles and of marble of various colors could be employed to introduce color and vivacity into the sombre deadness of the prevailing tone. Balconies, railings, crestings, cornices, eaves-soffits, and mullions of iron, bronze and copper would, also, always be available.

All the above suggestions, after all, appear to be summarized in the statement that monolithic concrete, *per se*, is an ungrateful and repellent material for exterior architectural effect; that it must be kept as flat as possible, the larger areas disguised or frosted by flat surface-ornament, and the general effect varied and brightened by accessory details executed in other materials.

Ancient Roman buildings offer no precedent for this problem. The so-called concrete of the Romans, though structurally fulfilling many of the same functions as modern monolithic concrete, was quite differently made, being composed of alternate layers of cement, mortar and small stones carefully laid by hand. Some of the smaller vaults seem to have been of almost pure cement, and to this day show the grain of the chestnut boards used as centerings or moulds. But the Romans always built up their "concrete" walls and piers between facings of brick; and the huge vaults of the Pantheon and some of those of the Baths of Caracalla were laid upon a complete inner shell of careful brickwork. The Assyrian palaces were built of soft unburned clay bricks which dried under the pressure of their own weight into uniform homogeneous masses; but these walls appear to have been for the most part faced with slabs of alabaster or limestone and flat enamelled tiles. The past offers no exact analogy to the problem under discussion, and its solution must be worked out by experiment, like all other æsthetic problems, under the guidance of common sense and good taste.

A. D. F. HAMLIN.

ON THE ARTISTIC EXPRESSION OF REINFORCED-CONCRETE.

[From Messrs. BACON & HUBER, Toledo, O.]

RESPONDING to your request in letter of 9th inst, for our views regarding the possibilities of artistic effects in reinforced-concrete:—

We assume that the lack of artistic effect, so far produced by use of any concrete blocks manufactured up to present time, places these out of consideration.

The real beautifying of reinforced or poured concrete is a

subject yet so new to all that no one can cite except from a limited experience, and a judgment based upon a general practice and observation of kindred matters.

We have given this subject some study in a quite general way, a little of it practical, and find that, many times, easy means present themselves of beautifying square or round columns, specially designed capitals, entablatures, bases, or panels; also window-caps, belts, string-courses, raised panels, water-tables, etc. These results can be accomplished by specially prepared wood forms, by a combination of sheet-zinc or other thin metal and wood, or by sheet-metal entire; in either case, the forms, when desired, can be made detachable without injury, and not very expensive—and the product smoothed or repaired where necessary.

For unbroken surfaces, sometimes unavoidable in large buildings, we have occasionally recommended the inner face of wood forms to have a beveled strip planted on and placed so as to leave a sort of V-joint at regular intervals, and left rough and of sufficient depth so that a subsequent thin dressing of coarse sand and cement put on with a float, before the surface is yet dry, may agreeably add to the effect.

A quite pleasing rough effect for large and entirely unbroken surfaces may also be produced by the use of the carpet float, and the coarse mixture applied very thin to the wet or unseasoned surface, as soon as forms are removed. The uses of the carpet, or other float, on exposed concrete surfaces, may be extended to great advantage generally, if applied with skill and judgment.

[From Mr. DONN BARBER, New York, N. Y.]

THIS is a pretty broad subject, though a very interesting one. It cannot be disputed that the use of concrete has a unique and proper field artistically as well as constructively. It should not, however, be forced to compete with other materials, nor should there be any attempt to make concrete imitate other materials either as to finish or design. Some charming things have been done in stucco and it would seem that the same general styles of architecture and surface-finish which have been used in stucco work could be realized in concrete.

There are certain forms in Italian architecture, and also in the so-called "mission" style, where concrete may be used not only effectively but sensibly. A few "don'ts" might be in order, and at the same time helpful. Don't try to imitate stone or brick, or stone forms, such as arches, lintels or Classic orders. The architectural details of design and composition should show that the material used is concrete; it should be allowed to stand for itself. Contrast of surface can be secured by means of shadows or deep reveals in window or door openings, and other apertures. Elaborate cornices and moulded belt-courses, and the like should be avoided. Sharp edges or horizontal edges are hard to obtain and anything less than a right-angle makes the removal of forms difficult. Greek frets and like *motifs* of flat decoration can be easily realized and even made very effective. Relief work, where necessary, can be applied in stucco on cement properly bonded with metal into the structure. This work, however, should be free from heavy overhang and from excessive weight. Large expanses of plain wall, long lines of pilasters or other architectural *motifs* usually associated with stone are almost impossible of satisfactory treatment in concrete. Colored tiles and bricks and terra-cotta can be embedded in the concrete or attached thereto by very simple processes. Copper can also be used in connection with these colored surfaces, or by itself, without much fear of discoloration by rust after the forms are removed. In the impress that is left by the forms can be cleverly managed all sorts of surface texture by building the reliefs on the forms where incised ornament is desired either in diaper pattern or running bands. This can be easily realized by nailing the reverse of the *motif* desired to the wooden form.

Bronze or painted pressed metal can, of course, be used to give color and ornamentation. Concrete surfaces can be treated after the forms have been removed by picking, hammering or chiseling. The sand-blast can also be used; all of these producing different effects according to what is desired.

Some of the later and more modern German work which does not lean too much to the "Art Nouveau" forms might offer inspirations which are capable of realization. The important thing, of course, is to design within the limitation of the manufacture of the material itself. The general composition will, of course, be affected by the constructive possibilities of the material and any adornment should be studied entirely from the point of view of its individual possibilities.

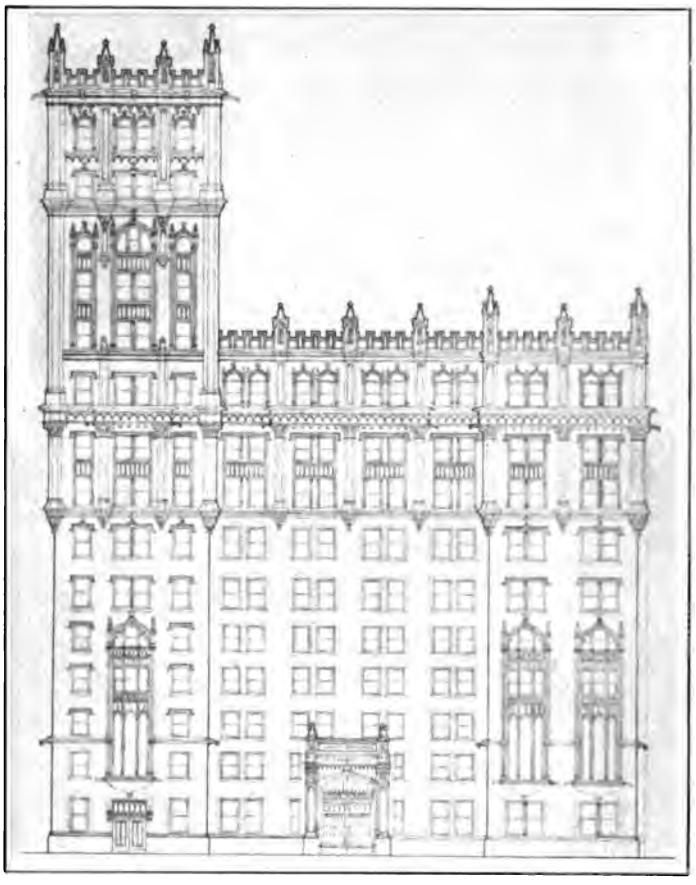
We are too prone in this country to use one material as a substitute for another. Our markets abound in imitation marble, imitation stone, imitation wood, in fact, imitation everything. Sound logic and a modicum of common sense as applied to artistic design in concrete is certainly capable of producing some very new, characteristic and interesting results.

The use of concrete has evidently come to stay, but we should not throw every other material to the winds for the consideration and exclusive adoption of this fad, irrespective of the type and character of the building proposed. Concrete has a definite use just as any other building material has, and it should be employed when the logic of the situation and other affecting circumstances dictate its use.

[From Mr. LOUIS DE COPPET BERG, New York, N. Y.]

CONCRETE was used—and used intelligently—by the French a century ago. In Eastern countries and in other warm climates—for centuries—it has been approximated by their heavy "mud" dwellings, the walls being as much as a yard or more in thickness, both to keep out heat and resist earthquake shocks. But with us the use of concrete is comparatively recent, but making astounding progress.

We have used it in floors for a decade or two, in various ways, but now we are beginning to use it as well for columns, walls, in fact every part of a building; making practically monolithic constructions. We are enabled to do this by the fact that we can now supply to concrete the necessary tensile strength, by introducing wrought-iron, or steel, reinforcement, whether by means of exceptional shapes, wires, twisted iron or steel; or iron or steel artificially stretched to reduce its primary elongation, etc.



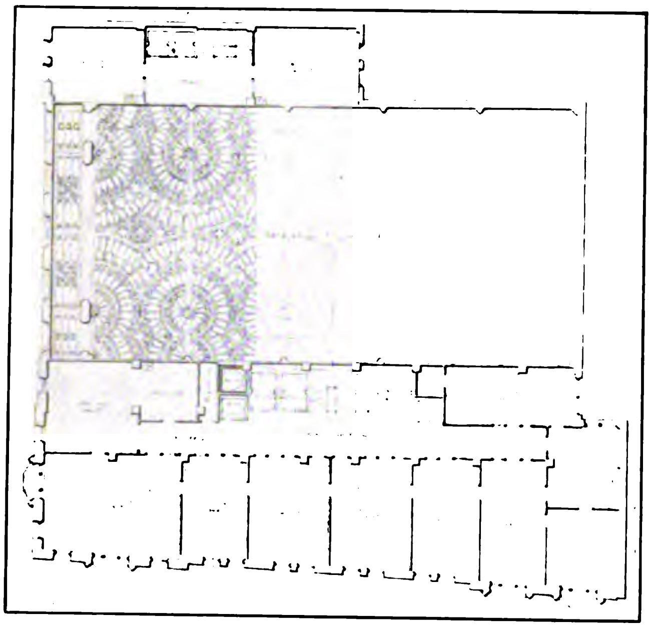
GRAIN EXCHANGE.

There is no question that the future construction of a majority of our American buildings spells CONCRETE REINFORCED, and with the biggest capitals at that.

With this upheaval in constructional methods, naturally arises your question: "How shall we treat concrete artistically?" In other words, shall we hide it, or boldly acknowledge it in our designing?

A properly designed building should not only be pleasing to the eye, but should announce to every beholder, through its design, the object or use of the building, and similarly—I claim—the nature of its construction.

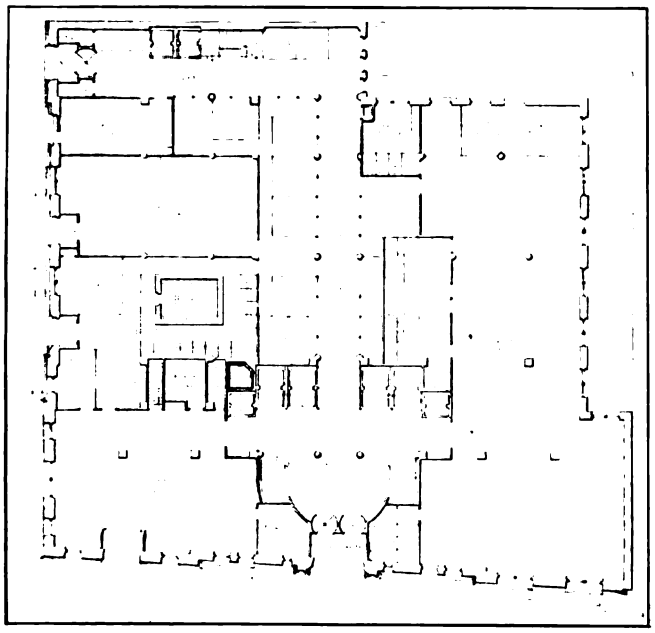
Of course, we can build reinforced-concrete buildings, with so and so many inches left off the front, and anchors sticking out, ready to receive the "applied" design of the architect. But that



EXCHANGE FLOOR: GRAIN EXCHANGE.

is not the question—I take it—but how to make concrete, itself, æsthetic.

My own idea was conceived from an experiment in Canada, at Ottawa, some ten years or so ago, when the expert of a certain concrete-construction company did not show up on time, and there being no time to waste, I undertook to carry out the concrete construction without the expert; the reinforcing steel having previously arrived. I used planed pine boards, and through fear that the water would be absorbed from the concrete,



ENTRANCE FLOOR: GRAIN EXCHANGE.

I had the boards watered, and the first layer was put in in the way of cement, rather than concrete; then the concrete was put in as is customary, in the usual proportions. When the boarding was removed I noticed that every grain of the pine could be seen in the concrete. This led me to think of the possibilities of cement concrete finish on the front of a building; though at the time we were hardly thinking seriously of concrete *wall* construction.

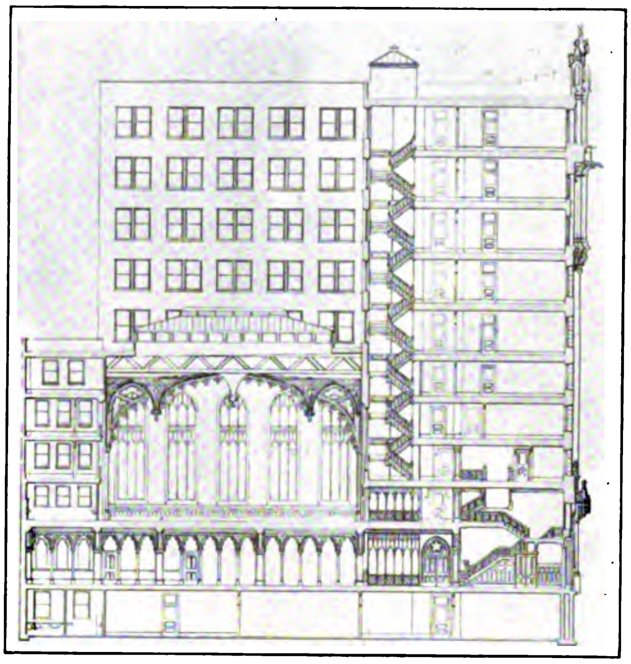
Now, this leads up to the very question which you ask: it is my opinion that we can get a fine concrete, practically almost cement, finish on a concrete wall, which will answer every truthful design, acknowledge the construction behind it, and at the same time be æsthetic. My idea is to keep back the solid construction one or more inches, as may be necessary, finishing it to properly roughened-up, or cross-sawed boards, so that the ultimate finish will take a good hold; then to pour in, in the way of a liquid cement, a very fine liquid concrete as a face finish. In some parts using moulds which will make the ultimate finish, in other parts putting wire, or other anchors to receive the applied finish, which can be cast in similar cement, or fine concrete work.

I send you some drawings prepared by me for a Canadian company which are intended to be executed entirely in concrete work, with such a finish as I have described.

My proposition is to make the pinnacles, corbels, dentils, in fact, all the ornamental work, of very fine concrete, almost, you might say, cement work, and apply them to the building, securing them with dowels or anchors.

The idea is to build up the wall with its roughened surface, story by story; then to set the moulds for the outside work, pouring in the finer stuff for the finish, where not applied. Concrete work will lend itself very readily to applied ornamentation of any kind.

As firmly as I believe that concrete is the future construction,



SECTION: GRAIN EXCHANGE.

I also believe that it will lead to more intelligent designing, designing that will be in keeping with the object of the building and its construction.

There can be no objection to the use of inlaid work on concrete fronts, such as rough-pointed stones, marbles, etc., or the smoother mosaic or glazed tinted tiles, or similar materials for spandrels, panels, etc., but I believe that architects should be truthful above everything when designing, and not use thin ashlar and other devices, to mislead the tenant as to the value of the wall.

I believe that concrete construction and its decoration—naturally applied—will lend itself to almost any design or style of architecture, excepting possibly the very heavy modern French Renaissance with its tremendous projecting mouldings, tremendously emphasized by the size of the buildings, over and above its original Greek models. To be sure, these projections might be reinforced by iron construction, but even then the shrinkage would probably make it impossible to carry them out practically. But, honestly, I think this loss would be a gain to the beauty of the decorations of our city.

Now, as to color. Shall it be painted? By no means! If you want the natural color, use steel brushes in cleaning down to remove such gloss, or sweat spots as may appear. Or, better yet! color your exterior fine concrete with cement finish, and do it in this way: In place of gravel or sand, use finely ground and various-colored terra-cottas and bricks in the mixture, and proportion them as you would in painting a water-color, or an oil so as to offset the green-gray effect of the cement and bring out the color effect you desire.

[From Messrs. CARRERE & HASTINGS, New York, N. Y.]

We have really given very little study or thought to the use of reinforced-concrete, excepting as a structural material, but from such examples as we have seen and such consideration as we have given the matter, it would seem to us that the material is tractable. If used with discrimination and judgment on logical lines of construction, with the introduction of other materials for decorative purposes, whether stone, terra-cotta, brick, tile or stucco, and especially, in view of the coldness of the material, if color is properly used and distributed in the ornamentation, we believe it to be susceptible of application and development on artistic lines.

This is best shown in the Blenheim Hotel at Atlantic City, N. J., which has many points of interest. The difficulty with this material is that it should be used in an ingenious rather than an artistic manner; also that it should be applied in imitation of stone rather than as a distinctive material with its distinctive characteristics.

We feel, on the whole, that this material is only adaptable to utilitarian buildings or commercial buildings, and picturesque schemes, but in no way fit for the more serious monumental or classic buildings, whether of a public or private character.

We would be interested in the application of this material in a building like the Ponce de Leon Hotel. We would not think of it, however, for any building within the metropolitan district, excepting strictly industrial or commercial buildings.

[From Mr. GEORGE CARY, Buffalo, N. Y.]

The architectural expression of reinforced-concrete, like that of the skeleton construction, is bound to be masked or covered unless the concrete construction is shown on the façade as part of the design.

The structural lines may be shown in the veneer, whatever the material for the exterior treatment. This may be done by emphasizing the constructional lines in the exterior treatment. If there be no visible roof or no reason for projecting cornice, the flat factory-like appearance can readily be overcome by the treatment of flat lines, flat panels or color-effects.

The Saracens, Etruscans and Egyptians understood the logical treatment of building better than most architects of to-day. Why do so many architects feel the necessity of a galvanized-iron or cheap projecting cornice, when the object is neither to shed the rain nor shield the windows below from the sun? They feel it is a necessary "architectural effect," when an effect much more logical and practical might be secured by the band or flat decoration.

If the aim be to show the concrete structural lines on the exterior, let the boxes, into which the concrete is poured, be patterns or dies that can be used again, as the plasterer uses his moulds again and again.

Unless a contractor has his own forms and tools, the concrete construction will not be an economical means of construction. The cost of making a mould or die of glue is not great when these same ingredients may be used over and over again, as each architect differs his design.

Concrete treated from sculptural moulds has at a distance the effect of stone and is far less costly than veneering the concrete with any building material.

[From Mr. THEODORE M. CLARK, Boston, Mass.]

In and about Boston the most satisfactory concrete walls are those finished with a coat of cement rough-cast. This suits the comparatively rough character of the material, and gives a texture well adapted to the large surfaces of walls cast in plank moulds, or laid up with building-blocks. Whether it may not, in future, be possible to devise a better finish is an open question. Personally, I incline to the belief that the most promising outlook for the artistic development of concrete construction lies in the direction of a revival of what is popularly known as "stucco" architecture, but with the difference that our moulded and cast work, instead of being executed in lime and plaster, precariously attached to greasy brickwork, can be in La Farge cement, or perhaps, in the white Portland cement which is promised us before the present season is over, and attached so firmly to the concrete beneath as to form practically one body with it. Among architects, "stucco" is almost a term of reproach; yet about nine-tenths of the Italian palaces, including many masterpieces of Palladio, Sansovino, Scamozzi, Alessi and the other great architects of the Italian Renaissance are executed in stucco; and, in the hands of the German architects, particularly in and about Munich, Frankfort and Dresden, stucco, often treated with color or sgraffito decoration, has given some of the most charming modern buildings in Europe. With the resources that our cement industry now affords, we should be able to follow these examples very successfully. Where a smooth finishing coat is to follow, all necessity for lining the moulds with cloth, to prevent the joints of the boards from showing in the wall, or for trowelling the faces and arrises, or patching up at completion, vanishes, and the rougher the surface of the concrete wall, the better the finishing coat will adhere to it. For running mouldings, a smoother and "fatter" mixture than any now in current use would be desirable, but the cement manufacturers could probably give directions for making such a mixture; and concrete that can be carved as easily as stone is already available, where something better than cast ornament is needed. We know from innumerable Italian examples what beautiful columns and pilasters, with their capitals, bases and entablatures, and what an endless variety of window dressings and other ornaments can be made with stucco, on a foundation of rough masonry; while, for those who like novelty, a suitable cement mixture, which can be applied in rough masses to a wall, and subsequently carved, would enable us to imitate, and perhaps improve upon, the present pretty French fashion, of lavishing festoons and garlands of flowers and low-relief figure sculpture on the outside of buildings.

[From Mr. HENRY IVES COBB, New York, N. Y.]

Concrete and reinforced-concrete construction are being abused and used in many places where they do not belong, just as skeleton framing has always been. Each construction is most admirable for its legitimate purposes, but there are a lot of engineering absurdities going up.

[From Mr. GUSTAVE W. DRACH, Cincinnati, O.]

Reinforced-concrete construction has gone beyond the experimental stage with us here in Cincinnati. I myself have built a large number of buildings using reinforced-concrete in a great many different ways. I have constructed some very heavy warehouses with brick bearing-walls and reinforced-concrete floors, beams and interior columns. I have built some, using a reinforced-concrete skeleton frame filled-in with brick curtain-walls just as you would in a steel-skeleton frame. I have also put up several buildings where the entire front, columns and decorations were of cast concrete. I have built spans from 20 to 65 feet long carrying a live load of from 200 to 600 pounds per square foot.

Several of the other architects here have also used reinforced-concrete treated in various ways architecturally; all of them have been quite successful. We have not had a single failure here in Cincinnati.

We find that the work can be done as rapidly as any other method of construction, more economically than many other methods and with more permanent results.

It is important that the reinforcement be properly designed, and, of course, very important that it be properly executed. The execution of the work needs very close inspection.

I think that very shortly this method of construction will be better understood by architects and engineers generally and will undoubtedly come into general use.

[From Messrs. ELZNER & ANDERSON, Cincinnati, O.]

Replying to your letter of April 8, asking for some ideas on the artistic treatment of reinforced-concrete, we beg to enclose copy of a paper [See page — of this issue.] written by our Mr. Elzner on this subject, which was read at the late convention of the Association of Cement Users, Chicago, in January.

[From Mr. J. J. FLANDERS, Chicago, Ill.]

I RECEIVED your letter, in which you request an expression of ideas on reinforced-concrete, at a time when I am in the position of the "man who attempted to build a house from ideas obtained from foolish journals which tell how to do impossible things and ridiculous stunts in the home building line."

Some attention had been given to the subject of concrete, in a limited way, in its use for foundations, walls and floors, when circumstances led to its use in the construction of a residence for myself. One of the arguments which induced the decision was its economical cost compared with other materials, an argument which experience showed was as reliable as the statements concerning the limited tons of fuel consumed in some house-heating plants before installation, when winter's trials demonstrate the unreliability of the maker's figures.

The decision to enter into the project of building a concrete house was not made without due consideration, but as the difficulties met with are not a part of this letter, they will be passed without mention.

The concrete-block architecture, which I am convinced has undeveloped merits, did not appeal to me and was dismissed from consideration, and mixed concrete, reinforced and built in forms, was decided upon. The exterior walls are of hollow structure, 12 inches wide, formed of two 3-inch walls with a 6-inch void between. The 3-inch walls are reinforced by steel verticals and horizontals, suitably placed and united to each other, forming a metal lattice in the center of the concrete. The walls were anchored to each other by metal ties so that a stable wall was obtained with the minimum of material. The interior floor-supporting walls were single, built of 4-inch thick concrete, reinforced in a similar manner to the exterior walls. The metal reinforcement was such that fissures in the monolith, by reason of the placement of new to old material or by unequal adjustment, were avoided.

The appearance of the walls when the forms were removed was a subject of concern, and investigation and thought were expended to obtain what was hoped would be an artistic effect that would show its birthmarks not too obtrusively.

Crushed limestone, from the size of a pea to a hazel-nut, with torpedo gravel formed the aggregate for the concrete. In the cement was used a minor percentage of hydrate of lime and the mass was mixed automatically in a continuous proportional machine mixer, coming out from the mixer very wet. On removal of the forms, this mixture gave a wall-surface which showed the irregular sizes of the crushed stone, and as none of the pieces was larger than would pass through a ¾-inch mesh, there were no large voids in the surface. It was difficult to prevent the workmen tamping the concrete too much, for as the mass was placed very wet in the forms it was only necessary to work it to place with a light metal rod to settle it. Using weighted tamp tools brought the particles of sand to the surface and resulted in a smooth surface next the dressed boards which was not desired, but which could not always be avoided because of lack of experience and care of the workmen. The columns and capitals supporting the veranda roofs were cast hollow, in sections, and when hard set in position in the building. The concrete for these was formed of torpedo sand and cement without crushed stone. The surface of the columns was of a smoother texture than the walls of the house and has an appearance resembling sand-finished plaster. No attempt at ornate or moulded courses was made.

A part of the wall-surface was trowel-plastered with neat cement to give contrast and relieve its monotony. These troweled surfaces are horizontal band-courses on the building and frames around the window openings. The variety obtained from this treatment is pleasing both in form and color contrast, while it is comparatively an inexpensive treatment.

[From Mr. J. H. FREELANDER, New York, N. Y.]

I REGRET that I have not been able to give more time to the consideration of the subject of artistic treatment of reinforced-concrete. The subject is extremely fascinating, and there is much to be said, it seems to me, on the decorations and exterior concrete surfaces.

In regard to the general color, I believe it best to apply same after the finished cement coat has been trowelled, and not to attempt to mix it with the cement beforehand. In this way an infinite variety of shades can be obtained. An occasional bit of colored terra-cotta, sparingly used, greatly enhances the effect of cement and concrete treatment.

[From Professor A. D. F. HAMLIN, New York, N. Y.]

PROFESSOR HAMLIN'S views will be found incorporated in an article, "The Architectural Problem of Concrete," elsewhere in this issue.

[From Messrs. HORGAN & SLATTERY, New York, N. Y.]

IT may be assumed that reinforced-concrete construction has passed the experimental, and is now in the trial stage.

The reinforced-concrete work done through this office, we may say, has been uniformly successful, owing, we believe, in a great measure, to the rigid testing of cements, careful inspection of materials, and constant and close supervision of the mixed materials, as deposited in the forms.

Granting that the problem is properly designed, the quality of cement and the degree of supervision exercised are the prime elements of success.

We designed, we believe, the first reinforced-concrete structure in New York City, about seven years ago, situate on the pier at the foot of East Sixteenth Street, to be used as a Bacteriological Laboratory for the Willard Parker Hospital.

BACTERIOLOGICAL LABORATORY, EAST SIXTEENTH STREET, NEW YORK.

In our opinion it is feasible to so design a reinforced-concrete structure as to obtain an artistic effect equal to a stone treatment. The mass can be made to appear monolithic, by omitting any imitation of stone treatment, and letting it show as though it were designed in plastic material, and not in imitation of stone or stucco treatment.

Large moulded cornices can be cast as the building is erected, and small ornamental work may be applied after completion of the shell.

It would seem that distinct color treatments, a modification of the "scag" method, could be arrived at by the use of stains in the cement mortar, plastering the stained material against the forms to a thickness of, say, one inch, before the body of the shell is filled in. We have attempted this on a small scale in a country house, and it has been fairly successful.

The field is a new one, and the possibilities of color treatments are apparent; but some experiments in practical application will be required on the part of architects bold enough to assume the risk.

[From Mr. GEORGE KELLER, Hartford, Conn.]

To your request of recent date I can not offer much in reply. I built the first building in New York City, for which a permit was issued by the Department of Buildings, that complied with the requirements for the "fire-proof class" of buildings.

While preparing the design I consulted with the Hennebique and the reinforced-cement companies and learned from them that it is much more economical to build curtain-walls of brick than of reinforced-concrete, while, on the other hand, it was much more economical to use reinforced-concrete for the structural part of the building than if the usual skeleton-steel system were adopted. This determined me to use reinforced-concrete only for the posts, girders, stairs, floor and roof slabs, so that none of the reinforced-concrete was exposed to view on the exterior, though the construction was visible in the interior.

STUCCO AND MOSAIC COLUMNS IN THE NAPLES MUSEUM.

I doubt if as good an architectural effect, artistically speaking, can be produced for the same outlay of money, by using reinforced-concrete as by using the usual building stones and bricks, in the present stage of this system. Probably, in time, this disadvantage will disappear, after workmen have had more practical experience in the application of a decorative surface to the material.

From time immemorial, where buildings were of concrete or baked clay, they have been faced with a coating of stucco, glazed or unglazed tile, porcelain, colored marbles, mosaic, or terra-cotta. The porcelain pagodas of China, the tile-faced remains found in Assyria, the walls and columns coated with mosaic embedded in cement to be seen in Pompeii, Rome and elsewhere in Italy, are examples. In Italy many of the façades of the cathedrals and churches are encrusted with mosaic and beautiful marbles, as may be seen in Orvieto, Verona, Rome, etc.

COURTYARD OF THE PALAZZO VECCHIO, FLORENCE.

If I were commissioned to design a building entirely of reinforced-concrete, I would probably wish to have a large part of the surface of the exterior treated polychromatically, using glazed or unglazed tile, colored terra-cotta, marbles or mosaic. The doors, windows and other openings would be spanned either by straight lintels or girders, the arch being suppressed as in the Parthenon. If the roof were visible, either sloping, pyramidal or domical, it would be covered with glazed tile, a beautiful example of which is to be seen in the dome of Dr. Parkhurst's church on Madison Avenue. The Ducal Palace in Venice, Giotto's Tower, the Palazzo Consiglio in Verona, and the before-mentioned Cathedral of Orvieto are fine examples of the use of color. A beautiful treatment, recalling the Giralda in Seville, would be to employ surface ornament arranged in panels, and of either cast cement or terra-cotta. In order to give variety to the design and remove the severity of the horizontal lintels, the heads of the openings might be filled with perforated ornament or lattice-work suggested from the Alhambra or other Arabic sources. I am aware that the office of the Hennebique Company in Paris and other buildings in Europe have the exterior showing the cement finish, but the color is bad, and a finer effect could be had at less cost than the modeling and casting of the applied ornament involved, by the use of tile or terra-cotta and for a little more expense beautiful marble inlay or mosaic might be employed.

[From Mr. ADIN B. LACEY, Philadelphia, Pa.]

THE answer to your question, "How best to treat reinforced-concrete when an artistic or architectural effect is sought," in my opinion, is that it is better to clothe the reinforced structure with other materials, the same as a steel structure is covered. The natural color of cement or concrete is not artistic; and while in Germany they have found a method of coloring it, as witnessed in the German exhibit at the St. Louis Exposition, it has not yet to my knowledge been done here satisfactorily. Further, the great absorption of moisture by concrete is against its use externally. This, as I am given to understand, has been overcome by the addition of hydrated lime to the extent of 15 per cent. of the weight of the cement used in the mixture.

[From Messrs. LORD & HEWLETT, New York, N. Y.]

WE do not feel that we have any very interesting opinion to express at the present time in regard to reinforced-concrete construction.

We believe that most interesting work can be obtained by the use of concrete in block form, but, up to the present time,

we have seen no reinforced-concrete construction which has been sufficiently perfect to make possible the satisfactory carrying out of any architectural design, no matter how satisfactory the design itself may be.

[From Messrs. MAURAN, RUSSELL & GARDEN, St. Louis, Mo.]

WE are in receipt of your inquiry, which interests us exceedingly. We agree with you that, up to the present time, architects in general have been more concerned with structural difficulties than with the study of a logical use or expression of this construction in the matter of architectural design. We cannot bring ourselves to believe that concrete should be clothed with a veneer of any sort, in just the same way as our steel skeletons have been covered, but rather that it should be used as a structural material which can also be made acceptable in design with some combination of flush panels or patterns made of brick or tile set in the concrete, which might be used on the exposed structural concrete—possibly bush-hammered to lend interest.

In a few days we will send you a drawing which we have just prepared for a commercial building designed after this fashion. The piers and lintels of the first story being covered completely, for practical reasons, with glazed brick in two colors while, above, piers and lintels are left exposed and the panels under windows are faced with the same enamelled bricks worked in patterns. We must admit that in working out this design we are still groping for a true expression of materials under consideration.

[From Mr. W. G. MITCHELL, San Francisco, Cal.]

I THINK it is Ruskin who says that "a building only begins to be architectural when something is added which is not absolutely indispensable." In this I agree. The architectural reaches beyond the utilitarian, and if in reinforced-concrete we are to confine ourselves to anatomical lines, posts, girders and floor-slabs worked out by formula, I do not see that we are to get anything much more interesting than the steel frame of the skeleton-construction type. Structurally, in my estimation, reinforced-concrete admits of greater possibilities than any of the materials hitherto used in the art of building, for on account of its cohesive strength, its capacity to withstand compression and its monolithic character, it can be used as a vertical post, horizontal beam or slab, and, furthermore, projected as a cantilever in a manner which perhaps is only possible with wooden construction. But Portland-cement concrete has an ugly color and must be covered with some surface other than its own.

The beauty of stone lies not only in the color it possesses and which all artificial substitutes fail to equal, but also in the endless variety of color from stone to stone, giving the whole a charm compared to which all artificial compositions imitating stone are lifeless. This brings us to the conclusion that an imitation of stone in concrete is not a rational solution.

First, then, I look to the plasterer's and modeler's art to embellish a reinforced-concrete building. The post, the arch, the lintel, the projecting balcony, the overhanging cornice, the groined ceiling and above all the dome are eminently suited to the material; but for the artistic finish of these we must look first to the plasterer and modeler. Where the building has not to be all windows I look for beauty to great, smooth surfaces of tinted plaster with, at the window and door openings, embellishments in rich examples of the modeler's art applied to the surface after the structural part has been completed. The whole tinted in some of the many tones that they apply so successfully in Mexico to their stucco buildings, ranging from pale blue and delicate green to the pinks of the sea shell and the stronger tones of orange and the like, or the whole brilliant in the white of the pearl or the restful white of ivory, or partly colored or decorated with bands and stencils. Where money is more plentiful, the flat surfaces may be covered with colored tiles.

In my experience I recall only one successfully treated building of this character; it is in the city of Mexico; the tiles are blue, orange and white, or mosaic (marble or glass) or slabs of marble may be successfully used.

The idea to be shaken off is that the architect is to be tied down to *the least concrete* that will do the work in safety. If owners will agree to pay only for that they cannot hope to get anything at all presentable, not to say beautiful, in reinforced concrete.

The stucco of Italy and Spain show that beauty is not inconsistent with the use of this material, but we must remember all the time that Portland-cement concrete or plaster is about the ugliest material used in all the builders' art. If you can afford nothing more, give it a coat of whitewash.

If structural lines only are to be allowed, the buttress and tracery of the Gothic suggest themselves as possible solutions.

[From Messrs. MORGAN & WALLS, Los Angeles, Cal.]

REINFORCED concrete is a structural material the same as steel, and we see no reason why it cannot be masked and treated, the same as we would a steel building, with terra-cotta, brick, stone, or any other material that the architect may choose to use. We have used terra-cotta on the exterior of our buildings where reinforced concrete is used structurally in precisely the same manner as when steel has been used, and pressed brick or stone can be used in the same manner, being supported on ledges and thoroughly anchored, the same as we would handle a steel structure.

Of course, if one wishes to study economy and honest expression of construction he can finish the concrete direct, carrying out any order, or any other architectural decorative features that he may wish to incorporate in the building. The architect has just as much scope in the treatment of a reinforced-concrete building as he has in a structural steel building. Cost is the only thing that curtails him in any treatment that he may desire to make of the building. It is less expensive and perhaps fully as effective treated wholly as cement, all moulds and other enrichments being cast or run in cement.

[From Mr. D. H. PERKINS, Chicago, Ill.]

THE easiest way to answer your question and tell how to use concrete is to tell how not to use it.

In my opinion it is not desirable to use it as anything but concrete. It should never be used in cast blocks to imitate stone. Above all the Classic orders and ornaments which are characteristic of stone and of the chisel should not be cast or moulded in concrete. I believe that this material should be used in large unbroken surfaces as roughly as possible, with no attempt at a "slick" finish.

The best work that I have seen has a surface made of large pebbles or large broken stone which, if the building is large, may be in pieces as large as small egg-coal. If a smoother material is desired for trimming window and door openings, it is easy to insert pressed-brick, cut-stone or terra-cotta.

In your question you ask for an expression as to how best to treat reinforced concrete when an artistic or architectural effect is sought. In general, reinforced concrete is used for floors and columns and has nothing to do with the artistic effect of the exterior of a building.

When concrete is used in large wall-surfaces I would regard it simply as masonry and not a question of reinforced concrete.

If, on the other hand, an office building is to be erected and the piers must be small, I believe the best method is to conceal it entirely, and place cast-iron or bronze frames around all openings and fill in from one frame to the next with mosaic, tile or thin terra-cotta set in pattern, allowing the surface to be entirely decorative rather than structural in effect.

[From Mr. W. L. PRICE, Philadelphia, Pa.]

REPLYING to your recent request, would say that I have written an article on the subject of "The Possibilities of Concrete Construction from the Standpoint of Utility and Art," for the American Association of Portland Cement Manufacturers, in which I said about all that I have to say in that regard at the present time. The Association doubtless would be very willing to provide inquirers with a copy of the paper in question.

[From Messrs. RENWICK, ASPINWALL & TUCKER, New York, N. Y.]

LIKE many other architects we are greatly interested in reinforced concrete, but have never used it in construction of a building, beyond the foundations. We have used it in a number of instances in the country for walls and pergolas and enclosures, and have made several plans to be carried out later. We consider it the coming material for building, but think it is still in its infancy in its mode of construction and that it will take some

time to solve this question. Of course frost, which prevents its use in extremely cold weather, is against it, but we have a great deal of faith in it.

[From Messrs. ROGERS & MAC FARLANE, Detroit, Mich.]

WE have tried three times to write an answer to your letter in reference to the "architectural treatment of reinforced concrete," and each time the letter when read meant nothing.

The question is entirely too broad for an answer.

Reinforced concrete is a matter of construction, like steel, and if we are ever to give an expression to reinforced concrete as such this expression can only be gradually put into concrete form, and I do not believe we will ever be able to give a special architectural treatment to this construction any more than we have been able to give a special treatment to steel construction.

It would seem rather fitting to give such a building an exterior cement finish, though we can see no special reason why concrete columns and beams should not be encased in stone, brick or terra-cotta. In this latter case, of course, there is no real concrete expression. Why try?

After all a concrete building really results in flat surfaces, which must be decorated without great projections.

Personally we prefer flat pilaster treatment as being within the limitation of concrete workers, and yet such a treatment leaves a broad field for individuality of design.

[From Messrs. ROSSITER & WRIGHT, New York, N. Y.]

THE great trouble concerning architectural and artistic effects in reinforced-concrete construction is the lack of competent and skilled mechanics to execute the work. In country work, for example, it ought to be possible to-day to build fireproof houses of concrete and they could be made to express the very best kind of simple and direct architectural style. Broad masses of wall-surface, simple roof lines, an accurate and logical reflection of the plan in the design will produce charming houses in concrete. Simple mouldings, enrichment of window and door openings and color applied to walls are all to be employed with most promising results. But where are the intelligent contractors and workmen to do this work? We have found it very difficult to find any except in the cities where the price is prohibitive for country work. In the city you can get the work done, but there are few contractors even there who understand the work. Five years hence it will be different. We ought by that time to have an educated class of workmen capable of doing ornamental work of all kinds in cement, and the cost of executed work should be such as to encourage the use of fireproof and permanent construction. When that time comes we look for a great improvement in the architecture of all average construction. Even in the hands of ignorant and unskilful architects design will be improved, for "features" must give way to straightforward construction and it will be more and more difficult to construct ornamentation. Furthermore the art of properly ornamenting construction will revive, for with the use of rigid material must come a fuller realization of the fundamental truths concerning artistic adornments. Imitation of stone or brick construction is not likely to be attempted in concrete, when it becomes economically possible of universal application to all ordinary structures. There is more probability of correct design within the necessary limits of the use of the material. Rich color effects, the use of mosaics and proper ornamentation of structural design are to be looked for, culminating possibly in a more distinct and differentiated style of architecture.

[From Messrs. SAXE & ARCHIBALD, Montreal, P. Q.]

WE have constructed no buildings with reinforced concrete in its entirety, not that we have anything against the system as a system of construction, but we are decidedly against the present method pursued in carrying out the work, *viz.*, the preparing of plans by the engineers of some of the reinforced-concrete systems and the later handing over of the work to contractors often ignorant of the construction. That is the reason we have turned down several propositions in our city, and as far as we can judge it is the reason why there are so many collapses in reinforced-concrete buildings.

[From Messrs. SOMERVELL & COTE, Seattle, Wash.]

IN discussing the artistic treatment of reinforced-concrete construction, the term may be taken to stand for two separate systems in so far as expression of material is concerned. The first, where the columns, girders and floors alone are of reinforced concrete, is amenable to the same artistic laws which govern any system of decorated skeleton-frame construction, as the constructive members may be assumed to take the place of steel.

In the second phase, where the exterior walls as well as the constructive members are of concrete, the problem of exterior decoration admits of no such latitude of treatment. Here the wall itself should be expressed by a plastic quality in the design —the possibilities of which are as yet in their infancy.

The greatest objection so far encountered in exterior cement finish is the lack of life and color incident to this material, and every effort should be made toward the discovery of a substitute which will be susceptible of a permanent range of colors by admixture of pigments—and at the same time be impervious to the weather and sudden changes of temperature. Should such a material be found, and no doubt it will be found, the problem of true expression will rest on the individuality and ingeniousness of the designer. In this connection there is no reason why tiles of plain or varied pattern should not be considered as appropriate material, provided, however, that they be plainly treated as tile incrusted in the surface of the wall. This opens up a range of design of unlimited scope in composition and color and may, when developed, tend to relieve our thoroughfares of their present lack of interest.

Some of the secessionists in design have already accomplished very good pioneer efforts in the direction indicated, and no doubt the time will gradually arrive when a new style, founded absolutely on truthfulness of expression, will supersede the present crude attempts to treat a cement construction as though it were of steel or masonry.

[From Messrs. STONE, CARPENTER & SHELDON, Providence, R. I.]

WE have yet to see reinforced concrete used in any way to produce an architectural or artistic effect and have not had occasion to use it where either was necessary, although there have been times when we should have been glad to use it, if we could have had any confidence that raised or depressed patterns, horizontal or vertical sinkages or satisfactory surface-texture could have been secured. We have never yet seen any work done with a good, straight and continuous arris or uniform surface, free from pits and exposure of the coarser particles of the concrete. The surface of the Harvard Stadium, which was pointed with compressed air tools, is the most satisfactory surface that we have seen.

We are seekers after just the kind of information desired by you, and shall be glad to learn from others that which we ourselves do not know how to perform.

[From Messrs. STURGIS & BARTON, Boston, Mass.]

As a partial answer to your enquiry we enclose working drawings of the Manila cathedral. This building is executed entirely of concrete, with the exception of the roof. The dome was designed for reinforced concrete originally, but on account of the expense this was dropped.

[From Professor RUSSELL STURGIS, New York, N. Y.]

YOUR communication of the 8th is before me, and is of the most interesting character. I am only sorry that my own experience as a practising architect came to an end before the introduction of reinforced concrete as a material easily accessible. I have had no practical experience with it whatever.

In common with other students of the fine art of architecture, I should fear that any attempt to build in monolithic or solid masses would be ruinous to external effect, and equally so to the larger and more interesting interior design. In architectural work much charm results from the slightly irregular surfaces—one stone, one brick, one block of terra-cotta offering a slightly different angle to the rays of light from that offered by another unit of the wall. A column of marble or limestone is far more beautiful with a shaft made up of many rather small drums. Again, the slight differences in color are invaluable, and the beauty of a rough brick wall is greater than that of a wall of face-brick, chiefly because the divergence in hue and even in tone is considerable.

If we are to substitute for the old masonry walls new walls cast in a single block, then we must consider what the Greeks

did with their work when it had been made to look monolithic by being covered with stucco. They built of soft stone habitually, and covered their surfaces with hard and perfect plastering of some kind; but this they did as a preparation for brilliant polychromy. That, indeed, would be supportable! That, indeed, we could face without shuddering! If some one would build a monolithic church, having first considered very carefully the effect of brilliant color and the pattern with which he proposes to decorate his church, then, indeed, we should rejoice to follow his experiment!

We can hardly hope for that, however; and as long as pseudo-Roman colonnades are the only things desired by architects, we must hope that concrete will not replace stone for the artistic parts of our buildings.

[From Mr. LOUIS H. SULLIVAN, Chicago, Ill.]

MY experience with reinforced concrete, by trend of circumstances, has been rather limited, and confined almost entirely to floor-slab work; thus, while I have investigated its constructive possibilities with considerable care, I have considered its artistic treatment only in a figurative sense. I have scarcely a doubt that it will lend itself to effective exterior treatment, especially, perhaps, in the way of inlays or mosaic effects, provided the scheme of the building is designed in the beginning for such results. Reinforced concrete, like all other material, it should be obvious, must be designed in accordance with its essential nature, and I have no doubt that if this is taken as a basis extremely interesting and varied results might be obtained. This, of course, is but a general statement of my views, on general principles. I have long desired to execute some effective exterior work in this material, but the opportunity not having presented itself, I cannot, of course, discuss the matter in detail.

[From Mr. J. E. TOURTELLOTTE, Boise, Idaho.]

I HAVE tried various methods to get an architectural effect in reinforced concrete, and have succeeded partially. I think the common effort of the concrete-block manufacturers to produce an imitation rock-face, such as is obtained by pitching off the face of sandstone in the ordinary manner, is the reason architects, as a rule, are so prejudiced against concrete stone.

No one can cast concrete to imitate a surface obtained by natural splitting or breaking. I have, in my practice, obtained very satisfactory results by casting the lintels, sills or arch-stones, as the case may be, and then having the workmen pitch them off after the concrete was partially hardened, in the same manner as is done in pitching face of stone to obtain a pitched rock-face. Ordinarily smooth or rigid surfaces, using light colored sand in the proportion of (1) of cement to (1) of sand, afford the best effects. We, in our section, have very white sand and a light-colored cement, so that we get a silver-gray color, and the surface, if a very good job is done as per above, resembles terra-cotta in appearance, so nearly that it would take a close inspection to distinguish the difference.

I have seen good results obtained for large flat surfaces, like the side of a house, for instance, by painting the forms with some cheap elastic paint and sanding on same with coarse white sand and using the facing against form of (1) sand to (1) cement mixture, not too wet; after forms are removed, cleaning off surface with a hose. This process gives a soft natural sand-finish, similar to the surface of No. 2 sandpaper, uniformly coarse and of an even color.

I do not believe in plastering over reinforced concrete for exterior work, as, in the majority of cases, the coat will get loose from the concrete and look shabby. Making vertical ridges in the form by using sand and paint, and making ridges while same is soft, and stripping the forms with ⅜-inch square strips to mark joints wherever you wish them, and filling these joints with cement mortar, pointing with a concave tool, makes a nice appearance, resembling tooled stone laid up in cement mortar.

I think that very smooth surfaces should be avoided in this material, as it looks pasty and cheap. Uniformly rough surfaces are to be sought. Finish the surface obtained by the use of the form instead of plastering over afterwards.

Beware of a sloppy mixture for facing. Color should be light, to suit me.

[From Mr. MORRISON H. VAIL, New York, N. Y.]

How best to treat reinforced concrete when an artistic or architectural effect is sought depends very largely upon the special conditions of each individual case, just as with any other material. However, there is one rule that should always be observed and that is the frank and undisguised acknowledgment of its nature, refraining from all attempts to imitate other materials. The failure to observe this rule has been the real stumbling-block more often than anything else. Throwing aside all attempts at imitation and frankly and freely adopting the peculiar properties of concrete opens up a large variety of effects adaptable to artistic design. Concrete is an extremely plastic material and can be easily wrought into form and surface appropriate and sympathetic with the style of architecture or the class of structure in question. It would be just as great folly to attempt to lay down hard-and-fast rules for the treatment of concrete surfaces as for the adoption of architectural styles, and it would seem quite natural to select an entirely different surface treatment for a building of Classic design from that for one of Mission design. A highway-bridge with formal surroundings should have quite different treatment in this respect from a country-road bridge with woodland surroundings, in order to attain the best results, although both may be of the same size and general shape. And yet the concrete surface is easily made to harmonize naturally and artistically with all these different conditions. With a very little special preparation and extra labor the surface may be varied, from the perfectly smooth and even face of straight cement and fine white sand to the rugged, yet uniform, face of the coarsest broken rock or gravel brought out more prominently by washing before it has fully hardened. All the gradations between these two extremes are possible, each with its own texture and effect. How natural and effective the bold, rough finish on a simple arched bridge over a woodland brook, with the nestling brush, the clinging vine and the winding, foliage-bound road! and again, how appropriately and harmoniously the clean, sharp, fine-grain effect of the smooth finish, combines with the pure Classic design. The plasticity and the great variety of surface-finish possible with it, make it easily adaptable to almost any taste or idea of artistic design. However, its artistic effects especially appeal to me in garden or landscape architecture, in half-timber design and in buildings in the "Mission" style. The coarser grout, carefully screened to even size and thoroughly washed, so as to give clean, bold relief, is particularly pleasing in the architectural features of landscape work, such as bridges, terrace balustrades, garden-walls, etc. In half-timber work the texture of the finish should vary somewhat with the size of the structure and the broadness of the general design, but should never approach the insipidness of a plaster effect. With the Mission style the surface should always have the even grain and texture of the coarse sand or fine gravel which so pleasingly relieves the broad, plain spaces. These surfaces are obtained by thoroughly flushing the selected material against the face form, removing the form at the proper time and washing the smaller particles from the surfaces with water. This exposes the character of the aggregate and the uniformity of mixture which thus govern the final effect, although it depends somewhat upon the extent of the washing. There are other methods of treatment which employ steel brushes, rubbing with wooden or stone blocks, the bush-hammer, muriatic acid, etc., but I believe that the washing method described is the most satisfactory. The forms should be properly prepared for this work so that the faces may be readily exposed and the form supports should be placed far enough from the wall surfaces to permit free access to the entire face. The most desirable treatment for the interior surfaces of reinforced-concrete structures would be, first, a thorough water-and-stain-proof coating and then plastering with Keene's cement for the walls and ceiling, with tiling for the floors. For roofs, tile or asphalt on reinforced concrete give the most desirable results.

[From Mr. EVARTS TRACY, New York, N. Y.]

Mr. Tracy's views and suggestions may be found expressed at some length in an article elsewhere in this issue, "The Idiomatic Use of Concrete."

[From Mr. C. HOWARD WALKER, Boston, Mass.]

CONCRETE used as a covering is a cast material, set in forms or matrices prepared for it, and has not the quality of wrought or cut work. If built in blocks, it has the character of an inferior artificial stone, of texture inferior to most of the natural stones,

and giving the same impression of strength that is associated with stone construction; but when used as a covering to iron it is devoid of joints, loses entirely the expression of stone architecture and becomes similar in effect to plastering. As it has a thicker body than paint, it manifestly conceals the structural skeleton and covers joints and minor details with one continuous thick coating.

It is, in its molecular character, similar to stone and is readily made to resemble stone, yet it should, if possible, have its individual character announced. It conceals the iron and does not give evidence itself of the strength which lies behind it. The first consideration in designing in reinforced concrete should be the avoidance of marked stone characteristics, such as the joints, tooled surfaces, quoins, corbels, etc., peculiar to stone architecture; the next should be an attempt to reinforce apparent weakness in spans, columns, etc., by lines or mouldings which give the suggestion of the strength of the concealed iron, *i. e.*, horizontal lines in the beams, vertical lines in supports. Apart from this the surface should be without joints, and if texture is desired, it should be of cast or stamped patterns, not imitative of stone cutting. The fact that concrete is easily broken at exposed sharp angles would suggest that all corners or mouldings likely to receive wear should be softened and rounded, rather than left crisp and sharp. Also, concrete can be used as a bed as well as for a covering, and the insertion of pieces of detail in tile, faience, glass or mosaic as ornament is more readily done in a concrete structure than in one of stone and is more consistent with the material. In fact, oriental architecture of plaster and stucco is much more analogous to concrete structures than is the architecture of wood, stone, brick or veneers of stone. Ornament upon concrete surfaces should be cast or stamped. If cast ornament is used, it should not imitate stone or wood carving, but be distinctly modeled work applied or set in. Concrete surfaces should be granulated surfaces without the impression of tooling. It is difficult to realize the strength of iron in structure if it is overlaid by materials which have greater body and consequent apparent solidity, and it is equally difficult to associate strength with slender columns and beams of concrete. So, it is important in design in concrete that the structural factors should be indicated and that surfaces in concrete should manifestly be curtain-walls or panels. A suggestion for treatment occurs in the framing of woodwork, but in that case joints show while in concrete work they are not evident. Champfered corners, coves and undercut mouldings employed to avoid superfluous material are all characteristic of concrete structure. In many cases all structural features may be unexpressed and the concrete remain in unbroken surfaces, merely as a covering. Such cases occur when openings are small in area compared to surfaces and when there is no expression of column and beam structure. Treatment of this character in no way indicates the iron and is negative rather than positive in character, but has the advantage of the broad and extensive unbroken surfaces which are so desirable in architecture. It is, therefore, a matter of choice whether the iron structure should be indicated or ignored, and the choice is governed by the necessity of announcing the iron, to give the impression of strength. The two varieties of concrete architecture are the type which is best represented by a pavilion treatment, and the type which is merely a concrete surface pierced with openings, and with ornament either set in or built up on the surfaces. As cracks from uneven shrinkage occur in broad concrete surfaces, the division of these surfaces into panels either by the insertion of other material, such as tile or marble strips, or terra-cotta, as frames to panels, or by incised lines, to give play for shrinkage, offers a further suggestion for surface treatment.

Concrete has not sufficiently fine character in appearance to make it essential that its own surface or texture should remain untouched, and it can therefore be painted, equally with iron or inferior woods, to give it an even color and an improved appearance. If finished with a fine stucco coat, it is an admirable background for polychromatic treatment, but all attempts to mix color with the concrete itself produce little more than crude combinations of lifeless neutral colors. Its prevailing natural tone is a neutral gray, which is colorless even in its shadows, and which is an excellent foil to rich and intense color, but is comparatively uninteresting in itself. Therefore it either requires a better surface than the material, such a surface to be obtained by stucco or paint, or it requires vivid, intense contrasts to give it life. These contrasts may be in its details or in its environment, and concrete buildings are much more attractive in a suburban setting of trees and lawns than they are in association with buildings of a nobler material in the streets of a city.

[From Messrs. WYATT & NÖLTING, Baltimore, Md.]

We feel that such material and method of construction is capable of being treated "with artistic and architectural effect" in a manner showing the distinct individual character of the material and methods employed in its use. We do not feel that any imitation of stone or brick material (or any other material used in blocks) is desirable, but that any method naturally resulting from a moulding process in the mass, such as low, flat-relief ornamentation, not undercut, and an elastic freedom in the form of openings, not suggestive of the pure arch or lintel construction, is admissible, and that an effect of broad and plain wall-surfaces, in contrast with certain other portions in rich ornamentation, is one to be aimed at. This form of reinforced construction appeals to us strongly as having possibilities of very varied and excellent artistic effects, as well as being admirable as to lasting construction, when properly carried out.

We do not infer that you would expect any sugestions as to indicating by surface treatment the interior metallic reinforcement in combination with the concrete itself.

THE IDIOMATIC USE OF CONCRETE.

THE structural use of reinforced concrete has, in the past few years, become an economic fact of the greatest importance. No other material has, in the history of the human race, so completely proved in so short a period that "necessity is the mother of invention."

The limited supply of lumber and the increasing cost of steel have demonstrated that a curtailment of industrial building must be looked for in the immediate future, unless some form of construction less costly than steel frame, less liable to destruction by fire, with its heavy annual tax of insurance, should be found. And so, within a decade, reinforced concrete has arrived and fulfilled certain structural conditions within such a short space of time that it seems to have burst on us almost as Minerva sprang, full-formed, from the head of Jove.

Concrete, plain or reinforced, has its limitations from a structural standpoint, and these limitations are rigidly marked; but it retards the ruthless destruction of our forests, it lengthens the life of our iron mines, and permits us to live commercially more in the future and less in to-day.

So much for the commercial and industrial side of concrete, very little in fact; but what I write is not from the standpoint of an economist or an engineer.

The rude shelter which man first made was for protection, and to best enable him to longest continue the struggle for existence. We have not, as yet, entirely passed that period of development, but we are entering on a stage where concrete as a structural material forces itself upon us as designers, and as everything which is useful is good, and good construction, truly expressed, cannot be bad, our problem is simply to find what is the true expression of concrete.

We cannot write in a new language without a knowledge of its grammar and its idioms. Concrete is as idiomatic as stone or steel, or wood, and the first lesson is: concrete is not stone, nor steel, nor wood, and we cannot paraphrase it in terms of either.

Concrete is a plastic material, and, when used as a bald imitation of something else, notably blocks in imitation of stone, though produced with the strength of chilled steel, and at a cost of one cent per cubic foot, is nothing less than immoral, and any architect of education and feeling who will consent to use it in such form is, I believe, without an immortal soul.

From the artistic viewpoint, concrete is governed by three laws: the first is the law of mass and proportion (and all the laws of construction are comprised in this); the second is the law of detail and texture; and the third is the law of color.

This last law includes the combinations of other materials with concrete in their proper and appropriate forms.

Of the first, it is useless to write here. If one knows how to arrange his composition with a truly proper and entirely artistic understanding of mass and proportion he knows more than most

of us. If he does not, the beginning of understanding is far behind.

Of the second, concrete detail is detail commensurate with the method by which it is produced, and by the limitations of the craftsman by whom it is carried out—in this case the laborer, with wheelbarrow, shovel and tamping-bar.

Why try to imitate the mouldings of marble, or wood, or metal in a mixture with three-quarter-inch aggregates, as we too often see attempted?

In concrete, we should not strive to analyze our substance further than the materials which we place in the mixer. As well set the goldsmith to work producing jewelry from granite. So let your details be large, bold.

Your reinforced-concrete structure, if it be truly a reinforced-concrete structure, is a monolith—the name itself suggests boldness, strength, dignity. Do not, then, belittle it with trivial detail.

HOUSE OF E. CHANDLER WALKER, ESQ., WALKERVILLE, ONT.
Albert Kahn, Architect.

Of texture much may be said. I do not think I put it too strongly when I say that the textural surface of concrete, as generally used, more than any other single consideration, has prevented architects from using it.

The surface left from the ordinary rough plank forms, with a wet mixture, simulating every knot and fiber of the wood, is only surpassed in ugliness by one other surface, which is that left on the careful and expensive "job" where the greatest care is taken to have forms made of dressed boards carefully matched, oiled, and sometimes even given a coat of hard plaster.

HOUSE OF E. CHANDLER WALKER, ESQ., WALKERVILLE, ONT.
Albert Kahn, Architect.

This usually leads the unsophisticated observer to enquire why such an imposing wooden building, or bridge, as the case may be, was painted such an ugly color. Such surfaces may at comparatively great expense be dressed and tooled, but then we simulate another material. We give it a surface belonging to stone; either we mark artificial stone joints, attempting to complete the deception, or we omit them, and give a fictitious stony surface to areas which, from their size, are palpably impossible to be stone.

Texture may be had, I have found in my own practice, in one way, which is simple and inexpensive. This is done, first, by a careful selection of aggregates, with due regard to both size and color, using rock, marble and crushed hard-burned brick, and second, by an early removal of forms and scrubbing the cement from the surface of the concrete.

Where extremely heavy loads are put on the structure, this method cannot be used in its simplest form, as it necessitates a too-early removal of forms; but in ordinary work and residences it is eminently successful. The surface of the concrete is played on by a hose, and at the same time scrubbed with a heavy wire brush, thus leaving the aggregates projecting from the mass about three-eighths of an inch.

This serves several purposes: first, the dead color of the cement gives way to a sparkling, live texture and color; second, no marks of forms are visible, and third, temperature cracks, which, although of no structural importance, are very unsightly, if they occur, are back from the face of the aggregates and are invisible. This surface, surprisingly beautiful in texture and color, has been obtained at a cost of one cent per square foot.

Lastly, the law of color. Many a building is pleasing to the eye, whose beauties might be greatly enhanced by a proper use of color. I do not intend to write a dissertation on the theory of color, but simply to state some methods of adequate addition of color to concrete structures.

First, you cannot successfully color concrete with artificial pigments. They are as fatal to appearance as the aniline dyes which have too largely prostituted the weaves of Oriental rugs, and last even a shorter time.

Color your concrete proper by a judicious selection of aggregates. You will be surprised at the range of color to be obtained from different rocks, marble, stone dust and sands from different localities.

Dull-glazed terra-cotta can be used with wonderfully satisfactory results, as exemplified in the Marlborough-Blenheim Hotel at Atlantic City.

The so-called Moravian [illegible] to concrete, and to blend in their texture and colors more harmoniously than any other material which I know. [illegible] are burned through [illegible] and with skilful disposition in placing them [illegible] wrong in their employment for giving a [illegible] of life to a well designed concrete building.

As with terra-cotta [illegible] associated with concrete, using it for [illegible] and employing concrete for curtain-walls.

Truly, concrete is here as a reality and demands a hearing from architects as well as engineers. The engineers have accepted their problem and solved it.

Shall we be less courageous or successful?

EVARTS TRACY.

CONCRETE WALLS AND FLOORS.

ARCHITECTURE is the art of building. It may be a fine art, if beauty is one of the points studied. Beauty has a natural basis in utility. Utility depends mainly on economy. Hence, if this art is in a high state of perfection, the buildings will be beautiful and will be economically constructed.

UPPER STORY OF THE EASTMAN KODAK COMPANY'S BUILDING, WEST TWENTY-THIRD STREET, NEW YORK.
McKim, Mead & White, Architects.

The economics of the builders' art is usually placed in the hands of an engineer. He should work with the architect (the artist) during the evolution of the plans, so that the final ones for the structure may combine a maximum of beauty, utility and economy.

No art is stable. Every art finds its basis in human needs. Needs increase, the higher and more complex the civilization. Arts should therefore be constantly evolving to keep up with the development in society. New materials require new methods of treatment. Strict adherence to old forms with new materials does not permit a maximum of economy—is not therefore most useful - and thereby loses in that which is the basis of real beauty.

Concrete has been used for building work from ancient times. Its adaptation to modern needs, however, has been actively exploited only very recently. The development so far made is enormous, but there is every evidence that the growth is still very young. The wide adaptability of concrete is proved by its varied use at the hands of its enthusiastic exploiters. The perfection in the art of its use must depend on an intimate knowledge of its characteristics, so that the utmost advantage may be taken of its good points, and that its poor qualities can be hidden or overcome. These qualities may be summarized as follows:

Good Qualities.	Poor Qualities.
Concrete consists of materials of comparative cheapness and almost universally obtainable.	The whole value of work erected in concrete depends upon untiring supervision, the
It [illegible]	[illegible] careful workmanship in [illegible] and compacting [illegible] and installing th[illegible]
[illegible]	[illegible] slightly during the [illegible] process.
[illegible]	[illegible] tensile strength.
[illegible]	Its plasticity when fresh makes its exterior appearance almost entirely dependent upon the nature of the materials confining it during the process of hardening.
[illegible]	The necessarily universal distribution of the cement through the whole mass gives the exterior natural surface a dull gray color.
Is [illegible]	Variations in mixture, impurities in the water, variation in the colors of the aggregates, produce gradations in the dull gray [illegible] irregular in amount and in superficial extent.

Except those having to do with its external appearance, the poor qualities of concrete can be almost entirely counterbalanced by its good points, provided the latter are properly handled by one thoroughly familiar with both the poor and the good qualities. To obviate the objections to the natural superficial appearance of mass concrete work, some artificial surface-treatment or the introduction of colored ingredients is necessary. The monolithic and fire-resistant qualities make concrete especially valuable for residence work, since such buildings will be exceptionally long lived, free from vermin, sanitary and fireproof.

Certain types of construction, devices of erection and methods of design are peculiar to each kind of building material, and to make the best use of any special kind the several peculiarities must be known and advantage taken of them while designing work. Very often details of arrangement and of decorative effect can be so modified as to take advantage of such peculiarities and give most satisfactory results. There follow some of the characteristics of concrete and reinforced concrete and the possible means necessary to take advantage of the good ones and obviate the poor ones—especially with reference to residence construction.

AS TO WALLS.

Under certain circumstances concrete, like brick, will absorb

a considerable amount of water, which will be given off again under natural conditions. This necessitates resorting to various devices in connection with concrete outside-walls of dwelling-houses to make them less absorbent and more impervious to water. The thicker the wall the less pervious it is, but heavy walls have obvious disadvantages. The more cement employed the more impervious the wall; but cement is costly. The larger the size of the aggregate used the more impervious, to some extent, 2½-inch stone giving one-third better results than ½ inch. Large gravel is many times better than large stone. Various foreign substances may be introduced into the concrete to assist in this point. Alum, lime-paste, soft-soap, lye, etc., are variously advocated, but their addition is usually detrimental and their action not well known. Several patent compounds are also on the market. Superficial treatment can also be employed. Either the outside or the inside can be plastered with special cement preparations. Several are advertised as almost perfect in quality. Careful troweling, like cement-sidewalk finishing, is very effective, as it produces a dense layer on the surface. Asphaltic and other so-called water-proofing paints have been devised, and when amply applied to absolutely uncracked surfaces are moderately effective. The construction of walls with an air-space is probably the best device, as the dead air also serves as an insulator against loss and entrance of heat in winter and summer respectively. The usual furring applied to brick walls is an effective method, but somewhat more costly than some others. Hollow concrete, terra-cotta, or composition blocks are also useful for certain walls, where plaster is to be applied to both sides. There are also several systems which produce hollow monolithic concrete walls at reasonable cost. With these, burlap, paint or other varieties of interior decoration can be applied directly to the inner face of the walls without the expense of plastering. At the same time, the outer face can be finished in any desired manner.

Concrete shrinks while setting. Also, of course, with fall of temperature. This shrinkage cannot be obviated; it can only be distributed or concentrated at special points where unobjectionable. Work constructed in warm weather is almost certain to show temperature-shrinkage cracks in the winter. Work done in cold weather is much less likely to develop cracks, but there are obvious difficulties attendant upon doing winter work satisfactorily and economically. The less cement used, the less the shrinkage. The larger the aggregate, the less the shrinkage. A small percentage of steel, properly located, will distribute the cracking so that it is practically invisible. The use of blocks of concrete or other material, locates the cracks in the joints, unless exceptionally rich mortar is used. This usually effectively conceals the cracks, which really exist, however. Where use is made of curtain-walls between main structural members, the walls can be joined to main members by slots in the latter, the full width of walls. Expansion and contraction will then produce movements only within these slots and cracking will be effectively concealed. Cornices, belt-courses, etc., by the use of reinforcement, can be prevented from showing anything except minute cracks; but it is much better to design such members with breaks, like pilasters, etc., at frequent intervals. The cornices, mouldings, etc., can be carried around these projections, and cracks can be concentrated at the angles where they are not so objectionable. Smooth surfaces are apt to show minute checks or cracks, when examined closely; and when they become cracked to any extent from shrinkage or contraction from change of temperature, they are very unsightly. Pebble-dash, stucco, or other method of rough decorative treatment, is really the best method of concealing cracking. Close examination will almost invariably show its existence, however. Smooth-plastered mouldings with rough stucco panels have been worked out most satisfactorily in some instances, and show few blemishes even on close examination.

Where walls are to be plastered or stuccoed, they should be left as rough as possible. Dry concrete mixtures, the use of very coarse sand, a slight dearth of mortar (not of cement), employment of rough lumber for forms, etc., tend to give such a surface. Surface coatings, like plaster and stucco, should be as thin as possible, where continuous good bond is assured. If bond can be secured only at comparatively rare intervals, a thickness of coating must be applied sufficient to have enough body to be self-supporting between bonding points. Conversely, where it becomes necessary to apply materials more than half an inch in thickness, some special means of securing a good bond should be provided. In every case it is wise to clean thoroughly the old surface by washing and scrubbing, and to roughen it by picking or hammering. Acid treatment is also effective, and there are in existence several secret and patented bonding preparations, consisting of tar and cement products. Even an application of pure cement-grout is often not effective unless the surface is first cleaned and thoroughly saturated with water. If greater thicknesses of stucco are required, resort should be made to mechanical bonds. Wire-lath, even when galvanized or painted, is not always of long life, and small-sized wire is of little value in view of the perviousness to air and moisture of the usual plaster and stucco. Quarter-inch should be the smallest size of iron wire ever employed. Use fewer bonds, spaced farther apart, if economy in first cost must be rigidly practised. Copper wire is effective but expensive, while vertical, dove-tailed bonding grooves or slots can be cast in the mass concrete at small expense. Overhanging cornices, etc., should be most carefully reinforced, because the difference in shrinkage between masses of different thicknesses is likely to crack off the overhanging portion. Although heavy shadows are probably among the best means of securing relief in concrete work, still the use of heavy projections and overhanging masses should be avoided as much as possible, unless they take the form of balconies, etc., amply supported on effective brackets or columns, in which proper reinforcement can be provided.

ENTRANCE TO THE EASTMAN KODAK CO.'S BUILDING, NEW YORK, N. Y.

In stucco, of course, mouldings can be run of almost any degree of intricacy and possessing almost any variety of angles and curves. However, if the work is to be cast in mass concrete, great care must be exercised to secure only such shapes of mouldings as will allow ready removal of forms without

[illegible] edges of a moulding. [illegible] even when [illegible] concrete cannot be worked into such mouldings with any degree of certainty as to result, unless the edges are rounded, beveled, or chamfered, and all surfaces given proper slopes to a run of [illegible] of [illegible] air and water. Aside from the liability of cracking, there exists another drawback to undertaking long runs of large surfaces in mass concrete, in the extreme difficulty and larger cost involved in maintaining the forms in perfect alignment. Such extended lines and surfaces would be broken occasionally by slight projections, to hide the wavy appearance almost certain to be found. Projections of an inch or two in thickness by two or three times as much in height, in Greek fret or similar simple design, can be constructed without much expense and may be exceedingly effective as decorative features, as well as aid in hiding blemishes of alignment. Such work in intaglio is even less expensive than when in relief, but fails in possessing any curative property.

Simple ornamental work, like the Greek fret intaglio spoken of above, simple fittings, etc., can be executed in mass concrete with wooden moulds; but their cost soon reaches undue proportions when more intricate detail is attempted and other methods must be followed. By the use of pressed-metal moulds, very complicated work can be accomplished in mass work; but such work is better cast in a shop and set in the work at the proper point, or after the mass work is complete and the forms removed, if proper recesses have been left for its reception. When it is intended that the moulded work shall be set as the work progresses, so that the plastic concrete is poured around the moulded blocks, the latter should be of as large size as possible, especially with regard to the bed. When they are to be set in slots left in the work, manifestly the moulded pieces should be as thin as possible. In either case, some reinforcement is necessary, considerably more in the latter case than in the former. Depressions, or continuous holes should be moulded into the large blocks so that good bond can be secured to the mass work, and metal bonding-clips must be used in the second case, with proper arrangements provided for their permanent hold in the wall and for their proper attachment to the moulded blocks. As mentioned above, these blocks should be of ample dimensions so that the corrosion which is likely to occur will not soon eat them completely through. In the same manner in which moulded concrete is set in or attached to mass concrete work, terra-cotta or moulded brick may be employed. With these materials a form may or may not be employed. If the design contemplates a continuous brick veneer, the brickwork can be placed first and so constructed and tied together as itself to take the place of wooden forms for wall columns and beams. If the veneer is not continuous, a form must be employed. Even then the brickwork may be erected in sections, scaffold-high, before concrete is placed; but care must then be exercised in pouring the concrete not to disturb the brick. By the use of small wedges to maintain proper thickness of joints, an excellent bond can be secured between brick and concrete, but the joints must almost always be pointed and the brickwork carefully cleaned. Tile work of almost any degree of decorative effect can be employed in a similar way. The pieces can be tacked to the forms with copper nails, or a patented process may be employed, in which perforated forms are used and the tile glued directly to them with common bill-poster's paste. When it becomes time to remove the forms, the work needs only to be thoroughly saturated with water so to soften the paste that the forms can be removed with ease. Tile will give any color-effects desired. Copper, bronze, painted cast-iron, etc., can be employed for panels where applicable. Massive color-effects can be secured, if care is exercised, by introducing coloring matter among the mass concrete ingredients. Such work, however, is subject to the same variations in uniformity of appearance as is uncolored concrete. Probably the best method of securing uniformity and extent of color is the use of colored stucco, or, perhaps, the application of water-colors directly to the finished surface might serve. In these matters Europeans have had much more experience than we have.

Tooling, etching with acid, and washing the surface with water while the concrete is still fresh are three other methods resorted to when it is desired that the mass concrete itself shall be left without superficial applications which may possibly crack off. These three methods are superior to all others, except possibly the use of tile or brick, or of rough stucco, in concealing the small cracking which is so likely to occur. When surfaces are to be tooled, it is necessary that broken stone be used in the aggregate, as gravel does not take the action of a tool with good results. By employing broken stone of various kinds and colors, together with different colors of sand and a white or gray cement, wide variations in surface effects can be secured. The usual reason for tooling is an endeavor to imitate stone work. The results obtained are apt to be poor imitations, except under conditions which make real cut-stone little more costly. When the surface is to be etched, uniformity of mixture is important, and gravel gives excellent results as well as almost all of the different combinations of aggregate suggested above. The etching process can be carried to any desired depth, but the best results appear when the action removes only the skin-like layer of cement mortar next the forms. Almost identical results can be attained with a scrubbing-brush and plenty of water, if the forms can be removed at an early enough date. With this end in view, special designs have been worked out for the forms. When small-dimension, uniform gravel is used, effects almost identical with pebble-dash stucco can be secured. Obviously, such treatment obliterates sharp edges and is inapplicable to cornices, corners, mouldings, etc., where sharp lines are desired. If such details receive their treatment, the result is somewhat like an old, weathered, time-worn structure. While the last-mentioned methods of treatment are usually less costly per square foot of finished surface than stucco, still, the results are not usually as satisfactory, and in the eyes of many people, the extra cost for that class of work is almost always well repaid in added beauty.

There are certain details of design which can be omitted in concrete, which are imperative with other materials. A window or door opening needs a timber lintel or a brick or stone arch to span it. In concrete, neither device is necessary, as the wall is a monolith with steel imbedded to prevent shrinkage-cracks at the corners of the opening. In this particular instance, besides serving no practical purpose, the cost of moulding lintels or arches is really a considerable item of expense in the construction of a building with many openings. Imitation quoin-stones are also costly details and there is small excuse for imitation stone joints, except to hide variations of workmanship between different day's work. These are obvious examples, but many other smaller ones exist which can be eliminated with good æsthetic and economic effect.

As to Floors.

In general, almost any arrangement of columns, beams, girders and floors can be constructed in concrete. Intricate, irregular arrangements are, however, considerably more expensive in concrete than in almost any other material.

Three types of floor construction have been evolved thus far. They may be described as, (*a*) long-span slabs between girders, (*b*) short-span slabs between beams which, in turn, are carried by the same girders, (*c*) large, approximately square panels supported on all four sides by beams, and having the slab reinforcement running in two directions, at right angles to each other, while in the first two types the slabs have their principal reinforcement run in but one direction. The second type merges into the first in some systems in which the beams are placed so close together that the space between can profitably be filled, flush with the beam bottom, with hollow terra-cotta or concrete blocks. The third type is usually less expensive than either of the other two, except with short spans or light loads. Under such circumstances, even the beams may be omitted, and the construction consist of nothing but columns and a continuous slab. The third type gives most stiffness in all directions against wind and other lateral forces, while the last-mentioned variety, as also type (*a*), are lacking in stiffness in at least one direction. This very lack may have been the cause of several concrete-building failures. It would seem, therefore, that where an ideal arrangement can be made, the most economical and most stable structure would result from placing columns at the corners of squares, connecting them by beams forming the sides of the squares and spanning the whole with slabs reinforced in two directions. Almost any house plan can be so altered as to allow of such a structural design, and partitions can be adjusted to fall under beams and intersect at columns. Both beams and columns can then be entirely hidden in the partitions, while considerable total building height can be saved when compared with other materials, because of the thin floor-slabs employed without false ceilings and the attendant loss in air-spaces. Of course, it is

not necessary to maintain exactly identical dimensions in all panels of a row, or between the widths of different rows; but as little variation as possible should be allowed from the square shape, since the economy inherent in that shape is soon lost when differences of span are introduced. On the other hand, combinations can be made, such as of two rows of square panels with a short-span single slab over a hall between the rows, etc. One panel at almost any point can be devoted to a stair-well, or the stairs may be placed in a special panel of different dimensions outside the regular series. When floor plans are laid out with these points in mind, much money can be saved.

Obviously, the same points that were noted regarding the finish of concrete walls are pertinent with regard to the finish of concrete ceilings. The ideal of decoration would seem to be to give a pleasing appearance to each member or portion of a structure and in such a way as, at the same time, to disclose its real use and composition. If this ideal is sound, the employment of such details as imitation beams formed in plaster under large-span concrete slabs is not good architecture. Such designs are reversions to the old wooden period. Similarly, the usual roof projections can best be made in concrete as simple cantilever slabs, while, almost invariably, false roof beams are applied for so-called æsthetic reasons.

Concrete floors finished with a cement wearing-surface are so much less resilient than wooden floors, that many people demand wooden top-floors even with concrete slabs. If a floor is to be finished with a cement dressing, many of the same points apply to the securing of a good bond between the main floor and the top finish as have been noted with regard to the stuccoing of walls. Unless the finish coat is installed at practically the same time as the under floor, a thickness of nothing less than 1½ inches should be allowed. Many advocate 2½ inches. In every instance great care should be exercised in cleaning and saturating the surface of the old work before the new is applied. One of the good points about a cement top on any floor, is that the cement finish can be carried continuously from the floor up the sides of walls and partitions, to form a base which is almost perfect in its sanitary properties. Several patent floor-coverings are on the market, which take the place of the hard, heat-absorbent cement dressing above described. They are usually much more costly, however, but are often an improvement in some point or another.

These are but a few of the many points involved in the use of reinforced-concrete, and others will occur almost daily to any one who is studying the evolution of this old-new building material.—E. P. Goodrich, *M. Am. Soc. C. E.*

REINFORCED-CONCRETE CONSTRUCTION.

ABOUT five years ago the writer was consulting engineer for a building in which a rather unusual stair construction of reinforced concrete was used. The building was otherwise of the typical steel construction, and the foreman who put in the structural steel work was very skeptical as to the strength of the reinforced-concrete construction and insisted that it could not possibly carry its own weight, but would undoubtedly collapse when the céntres were struck.

When the concrete had set and the centres were removed, I conducted a series of very severe tests and invited the doubting Thomas to be present. This he was delighted to do, prepared, no doubt, to gloat over my discomfiture when his prediction should come true.

However, nothing happened to justify his evil forebodings. On the contrary, the tests proved the construction to be exceptionally strong and rigid; and as a result the doubter at once developed into a rabid reinforced-concrete-enthusiast. He could see no limit to the strength and usefulness of this wonderful material, and I would not be surprised if, some day, he should attempt to carry his enthusiastic opinions into practice and come to grief.

This, I think, illustrates the conversion of most people from the use of steel to reinforced concrete, and also explains the many failures. We begin with the very justifiable fear of the untried, coupled with lack of ability to analyze the forces at work, and for this very reason become over-confident when the construction, in spite of our misgivings, turns out to be strong and rigid. But there is really nothing to be surprised at. The combination of steel and concrete is only just as strong as the simplest calculation tells us it ought to be, and there is absolutely nothing mysterious about it. It would, however, appear as if many designers (?) believe that a few steel rods impart a magical strength to the concrete. You will, for instance, find that while a good concrete pier is only loaded up to some 15 tons per square foot, say 208 pounds per square inch, you need only make this pier long and slim and introduce four tiny vertical rods, that of themselves can carry no compression, in order to make this concrete strong enough to sustain anywhere from 600 to 1,000 pounds per square inch. What has really happened is not a great increase in strength but a great reduction of safety, as instanced by recent failures of several buildings so designed.

I think architects are open to severe criticism for the manner in which reinforced concrete is designed. No one can expect every architect to be an expert in a new material or even to study up its antecedents, but an architect has no right to accept without personal examination the word of the man who tries to sell him the new material, *i.e.* the contractor, or, as he often styles himself, the contracting-engineer, a title that I suppose has been adopted to inspire confidence.

I do not wish to appear as doubting that some contractors are able to design properly a reinforced-concrete or other structure, but with a material of such varying strength and with interests so conflicting as those of owner and contractor, I certainly consider it next to criminal to place the design in the hands of the latter—almost inviting him to dishonesty. What may be expected from this practice is well illustrated by a number of recent failures, some of them resulting in great loss of life and, at least in one case, in an actual indictment against the contractors.

If we had arrived at definite conclusions as to permissible stresses in reinforced concrete, the matter would not be so bad. Anyone who designs steel structures must work within well-established limits, and a step beyond is at once stamped as dishonest. But not so with concrete. Building-laws are silent or vary enormously in their provisions, and so offer chances for the dishonest or the ignorant to dodge responsibility.

I have often been met by the statement: "It is not well to furnish a detailed design in reinforced concrete, as it prevents different firms from using their peculiar form of construction."

This is entirely a fallacy. The design should be at least as detailed as for a steel structure, or rather it ought to be much more fully detailed, as well-established standard details do not exist, as is the case with steel construction, and a good design will fit any special form of construction. Only, one must specify the size of bars, but these bars may be of any of the standard makes, as twisted bars, corrugated, Thatcher or Kahn bars, etc.

But, you will say, some of these bars have a very high elastic limit and will allow of much higher stresses than others. In this I do not agree. The commercial steel of to-day has an elastic limit of somewhere above 32,000 pounds and not above 36,000 pounds, and is a uniform and safe material to use.

It would cost no more to roll our I-beams or other shapes of high carbon steel with an elastic limit of above 40,000 pounds, but such steel is not nearly as uniform and reliable and is therefore not used. Nor is there any more excuse for using it in reinforced concrete.

Specify your steel to have an elastic limit of from 32,000 to 36,000 pounds, in plain bars, and load it in tension up to 16,000 pounds per square inch for important members, or possibly 18,000 pounds for roof construction and for girders which only gradually get their full load. If the steel, through cold working, has gained a higher elastic limit, consider this offset by the greater brittleness and do not increase the stresses on this account.

The concrete should not be stressed over 500 pounds to 600 pounds in compression, depending on the importance of the members.

Columns having only vertical reinforcement should carry not over 500 pounds in compression, and the vertical rods should be well laced together and their area should be at least one and one-half per cent. of the area of the column and this be loaded to only 5,000 pounds per square inch, or as much more than the concrete as the ratio between the modulus of elasticity and of the two materials, here assumed to be 10, or 3,000,000 for concrete and 30,000,000 for steel.

But above all, if you cannot make your own design, either turn it over to an expert designer or, if you must let the contractor do the designing, have an expert engineer pass on the design and you will save yourself much worry and possibly humiliation and grave responsibility, if not actual indictment for gross neglect in case of failure of the building, with consequent loss of life.

Having secured a safe and economical design on which every bidder can make a close estimate, without any guessing on the quantities he will be called on to furnish or as to what may be saved by judicious skinning, the next step is to secure such efficient supervision at the building that the danger of poor work or the omission of essential members in the reinforcing is reduced to a minimum.

It is evident that very careful supervision is necessary, and supervision of a very different character from that required in the building of the steel-cage construction. In such a building the supporting elements, as columns, girders and beams, are brought to the building ready to be erected, and there is generally small danger of placing them in a wrong position, so that the most superficial inspection is sufficient to insure the safety of the building. Not so with the reinforced-concrete building. Here the wooden forms or moulds of the proper outline are first to be built, and inside the so-established outlines the supporting members are constructed. The reinforcement of the girders and beams, and sometimes of the columns, may be shipped as units ready to be erected, but more generally a mass of rods and wires are delivered at the building to be placed in the different members, and it is easily seen what careful attention is required in order that each rod gets in the place where it is wanted.

PHŒNIX SENIOR SOCIETY BUILDING, DARTMOUTH COLLEGE, N. H.
W. M. Butterfield, Architect.

But even after the reinforcing rods are properly placed in a member only a fraction of the work is done. The concrete is now to be mixed, and just so much sand, cement and stone or gravel must be used, with not too much nor too little water; and all these ingredients must be carefully mixed. It may be getting late and the men are in a hurry; it may mean double pay, if overtime is necessary, before the batch of concrete is all laid, and the contractor or his foreman will try to rush the operation of mixing. And just here the superintendent's presenec is absolutely necessary or a poor concrete is apt to result.

But supposing the concrete is properly mixed, the moulds built of the proper dimensions and the reinforcing-bars put in the right places and in the required quantities, even then the work is only half done, for if the concrete is not well tamped in place, or if even a small quantity of rubbish, such as sawdust or chips, accidently drops into a mould between two layers of concrete, or if the work goes so slowly that some of the concrete takes its initial set before being placed, or if it is winter and the pleasant morning turns into a cold, freezing day, in any of these cases the concrete may have its theoretical strength very much reduced, and the one weak member resulting may cause the collapse of the entire structure.

It must be very apparent that the ordinary superintendent is not equal to look after this work, and still more it is evident how utterly inadequate is the superintendency furnished by a daily visit to the building by the designing architect.

What is needed is to have one or, on a large job, two, or even three inspectors under the general control of an expert, so that every detail of the work can be watched. In no other way is it possible to secure an absolutely safe structure. This extra inspection would, of course, involve some expense, but considering that the safety of the building is at stake, the owner should be willing to pay the cost, which in any case will only be a fraction of the saving, in the use of reinforced concrete, over steel.

GUNVALD AUS.

CONCRETE SURFACES.[1]

THE ordinary concrete structure—whether of building blocks or monolithic masonry, and whether as left by the forms or as commonly finished for exposure to view—is anything but pleasing in appearance, and this fact seems to be the principal reason for the disfavor with which some architects and engineers regard concrete as a material for construction.

The blocks usually have a bubbly, artificial-appearing surface, subject to a discoloration, that is generally of a sickly or lifeless hue, which offends the eye quite apart from the unpleasant effect of the machine-like regularity of such blocks as are made in imitation of rock-face ashlar. Monolithic concrete is usually finished either by painting with a thin cement wash or by floating, and it is doubtful whether really satisfactory effects have ever been produced by either of these methods on work that was in the forms long enough to get quite hard. The material that ordinarily segregates against the mould forms a skin that seems to have the quality of making very uncertain the attachment to it of any coating, whether of neat cement, paint or of plaster, and if no coating be applied to it and the skin be not removed, the appearance of the work, particularly after a little aging, can be adequately characterized only in language that is too picturesque for a serious paper.

There is, therefore, an active demand for a means of putting a better front upon a concrete body without overloading it in cost.

It has been suggested that a stucco finish can probably be made to adhere permanently, and it is reported that a plaster coating-mixture of lime, cement and sand has been tried with gratifying results. A very handsome appearance can undoubtedly be thus obtained, but it is generally as unlikely that the coating will endure wholly intact, and as certain that it will not unless the surface be first carefully prepared for it by some such method as treating with acid or by picking it rough, which altogether would make an expensive finish, and if portions should loosen and come off the condition would be shabbier than anything else that can be conceived.

The mere roughening, however, of the concrete surface to insure the adhesion of a coating of any sort will itself, if completely and uniformly done, produce a pleasing and ordinarily satisfactory finish—provided, of course, that the concrete has a complete face fully flushed against the forms.

It follows, then, that tooling the surface to the extent of removing the film is a practicable and always available method of finishing it, and the tooling can be done with a bush-hammer or an axe, by hand or pneumatic power. The tool should be light, and the blows only heavy enough to "scalp" the work, heavy tools and blows being liable to "stun" the concrete, particularly at and near edges. This scalping partially exposes the material of the aggregate, but does not clean it. The complete exposure and cleaning will come with time and exposure to the weather, if the work be outdoors; or the action of the elements can be anticipated by washing the tooled surface with a half-and-half dilution of hydrochloric acid, which of course must be thoroughly rinsed off.

The cost of such tooling, without subsequent cleaning with acid, has been variously found to be from three to twelve cents per square foot, according to the character and extent of the work and the equipment.

Experiments upon small blocks have shown that a very expeditious method of removing the skin is grinding with a coarse grained emery or carborundum wheel. The skin is cut about as quickly as the block can be well passed over the wheel, and although no actual comparison has been made and there is no knowledge of a trial of it on large work with a portable wheel, it would seem that with compressed air or an electric motor and a flexible shaft, the emery wheel might be used on any work with about the same facility as a power bush-hammer, and the rapidity with which the wheel cuts away the face indicates that such a method of tooling will prove to be no more expensive than bush-hammering. The wheel might be small in size and therefore of light weight for convenience in handling, and could be fitted with small guide rollers to limit the depth of cutting and secure reasonable evenness in the dressed surface.

[1]A paper by Henry H. Quimby, M. Am. Soc. C. E., read at the annual meeting of the National Association of Cement Users, Chicago, January 8-11.

Building blocks have been treated, without the preliminary tooling, by immersion for a sufficient length of time in an acid bath strong enough to dissolve the skin and some of the cement mortar between the particles of the aggregate, exposing and cleaning the particles and even leaving them in relief. This process, which is said to have been patented, includes washing after the acid bath, then immersion in an alkali bath to neutralize any absorbed acid remaining, then final washing with water. It is presumably expensive, is of necessity limited in its application to portable work, and care must be taken to avoid using in the concrete any sand or stone that is liable to injury by the acid.

WAGONER UNDERTAKING CO.'S BUILDING, ST. LOUIS, MO.
F. C. Bonsack, Architect.

It thus appears that the removal of the film and exposure to view of the clean aggregate by whatever method obtained is the essential feature of the most certainly durable and generally satisfactory surface finish of concrete. Of course it should be understood that the surface must be fully flushed—must be without cavities or any visible voids between the stones. This condition can only be secured, when pressure cannot be applied, by using wet concrete thoroughly spaded or forked against practically water-tight forms, or by using with stiffer concrete a separate mortar or fine concrete applied against the face form with a trowel just in advance of the body concrete. Stiff concrete will not completely flush against the forms by mere ramming, even if the ramming does work it to a liquid on the top of the layer. Care must be exercised with every portion of the face or voids will occur and appear when the forms are removed, and will necessitate patching. Such repairs cannot be made sightly unless at the time they are made the body is still green —before hard set has taken place. If the surface is accessible while still friable, blemishes can easily be removed without leaving a scar.

This fact suggests the desirability of early removal of the forms, and their removal after the concrete has set sufficiently to maintain itself, but before hard set has taken place, furnishes the opportunity for applying a treatment that is very convenient and inexpensive, yet produces the most pleasing and in all respects most satisfactory finish which has yet become known.

This process consists wholly in scrubbing the fresh surface with a brush and water, thereby removing the film, and with it all impression of the forms, and exposing the clean stone and sand of the concrete. If it be done at the right time—that is, when the material is at the proper degree of set—merely a few rubs of an ordinary house scrubbing-brush with a free flow of water to cut and to rinse clean, constitutes all the work and apparatus required. A little additional rubbing will bring the larger particles into appreciable relief, which heightens the effect and, in the judgment of most observers, enhances the beauty of the face.

The practicability of removing the forms at the proper time for such treatment depends upon the character of the structure and the conditions under which the work must be done. The system cannot be applied to the soffit of an arch nor to the underside of a reinforced-concrete floor, because the centering must be left as support so long that the surface against it is almost stone hard. If, however, the surface material there is the same as at the sides which have been scrubbed, the soffit can be brought to match the sides by tooling and then cleaning with acid and water as before described.

The texture and color of the surface obtained by this process will vary with the character of the aggregate of the concrete, because in a mixture of cement, sand and stone the cement is in small proportionate volume and has but little influence on the color of the ensemble. Some opportunity is thus afforded for the exercise of individual taste in texture and color, and it is very easy to arrange a quiet color scheme in any work that may be suited to it. Warm tones can be obtained by the use of crushed brick or red gravel. A dark colored stone with light sand will produce a surface that resembles gray granite. Fine gravel gives an appearance so like sandstone that even close examination will not enable one to distinguish between them. In the construction of monolithic concrete masonry for bridges for

INTERIORS: WAGONER UNDERTAKING CO.'S BUILDING, ST. LOUIS, MO.
F. C. Bonsack, Architect.

the city of Philadelphia it is the practice to use a fine concrete or granolithic face composed of 1 cement, 2 bank sand, and 3 crushed and cleaned black, slaty, shale, of the size commonly used for tar roofing—say ¼-inch to ⅜-inch. This mixture is placed against the face forms and the body concrete is placed against it and rammed into it immediately. In the three years since this process was adopted and during which it has been applied to twelve bridges, no case of separation of granolithic face has been observed, and not a single hair-crack has been found, nor any kind of deterioration or tendency to discoloration noticed—indeed the weathering seems to make the surface cleaner and more stonelike.

In general the washing is done on the day following that on which the concrete was deposited. Portland cement is used. When a quicker setting cement than usual is met, or through some other influence the surface is found, upon removing the forms, to be too hard for the scrubbing-brush, a wire brush is employed first, then a small block of wood or a brick-bat with water and sand, which is found necessary to cut the film.

If the surface has hardened so as to require the grinding action of the sand and block the aggregate will not be brought out into very decided relief and the face will therefore be comparatively smooth. In cold weather, when crystallization proceeds slowly, the forms may require to remain two days before the washing can be done safely, and in very cold weather they have been left a whole week and yet the scrubbing was successful.

Consideration of the cost of the process may involve the question of the design of the forms. When the work is such that not the whole height of it can be placed in one day it may be advisable to construct the form so that the planks can be removed without disturbing the uprights. This will add to the cost, but may be compensated for by the saving in planks. In the case of a long or heavy wall where only one course can be laid in a day only one course of planks is required.

If indentations are made at the joints between courses, the joints can easily be concealed. If the indentations are not desired great care must be taken to scrape thoroughly clean the top of each course quite to the face and to use the same consistency of the new granolithic facing as that of the lower course. It is possible thus to make a joint that will not be very noticeable, but the vigilance of the inspector must not be relaxed at any point, and even then the joint will be at least distinguishable. The bead indentations are very convenient and useful in working, and in appearance they relieve what otherwise would be a large blank area.

When the planks are desired to be removable the studs are set some distance from the face—8 inches to 12 inches—and the planks are braced against them by cleats nailed so as to be easily loosened. The planks are in one width the full depth of a course, either solid or made up of narrow planks battened together. A triangular bead strip is nailed to the face at each edge and the layer of concrete is finished at the middle of the top bead.

When a plank is taken off it is scraped clean of adhering cement, then oiled, and reset with its bottom bead fitted into the half indentation just left by the top bead.

A couple of carpenters with perhaps a helper will take off and reset a course of plank say 100 feet long in four to eight hours. The course may be whatever is desired for either convenience or architectural effect. The yardage of concrete accommodated will vary also with the thickness of the wall and the proportions of face to back. Thus the cost of changing forms will vary from 25 cents to 75 cents per cubic yard. In building work generally the ordinary forms can be used. Of course, care must be taken not to load members too heavily while they are green and naked, but the same care should be exercised with members still in forms because the forms while preventing collapse will not prevent injury to the concrete by undue pressure upon it.

The cost of the scrubbing is trifling, if done at the right time. A laborer may wash, say, 100 square feet in an hour, or the same area if it has been permitted to get hard may take two men a whole day to rub into shape.

The early removal of the forms makes possible the neat repair of any blemishes that may be revealed.

The question of efflorescence is an important one in the consideration of the appearance of concrete structures. The scrubbed surface is not subject to the hair-cracks that in some faces seem to absorb moisture during storms and then exude the white spreading disfigurement. But if there are joints in the work there is danger of efflorescence, and observation leads to the belief that if within twenty-four hours of the completion of a course the top surface be carefully scraped to remove every particle of the *laitance*, and then before depositing the next layer of concrete the scraped surface be coated with thin cement mortar, the joint ought to be impervious to moisture from either front or back, and no trouble with efflorescence ensue.

INTERIOR OF THE HERBIVORA BUILDING, CINCINNATI ZOOLOGICAL GARDENS.
Elzner & Anderson, Architects.

THE ARTISTIC TREATMENT OF CONCRETE.[1]

THE consideration of concrete from an æsthetic point of view may strike the average cement-user as inappropriate and impossible, for hitherto the term "concrete" at once suggested foundations, piers, dams, abutments, and, nowadays, it more than likely calls to mind columns, beams, floors, walls and, in fact, the entire structural parts of buildings. But it must be evident that our experience with this new material, new only, however, in the sense of adaptation, will show that like all legitimate and substantial structural materials it, too, will prove to be susceptible of artistic treatment in design. Wood and stone architecture are as old as the hills, and the art of the mediævalist in developing true styles with these humble materials rightfully belongs to the world wonders. Brick and terra-cotta can scarcely claim quite so much distinction, although in point of artistic treatment they were brought to high development in the Gothic art of Italy. Iron and steel, however, do not fare quite so well, except in a small way along the lines of purely ornamental work; for when the modern rolling-mill began to turn out its product of structural-shapes, and engineers discovered the wonderful possibilities of riveted sections and connections, there was a great rush for structural iron and later for steel. Everything imaginable was made of it, more so in Europe than here. Bridges and viaducts, certain classes of business blocks and public buildings, even churches and cathedrals, all vied with one another in their

[1]A paper read at the annual convention of the National Association of Cement Users, at Chicago, January 9, by Mr. A. O. Elzner, architect, of Cincinnati, O.

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architecture of iron and steel, and while some notable attempts achieved a measure of success, it required many years to develop an artistic style of design. Yet even at this late day structural engineers as a class seem determined to ignore the application of æsthetic principles to their designs of exposed work.

But we feel quite hopeful. There has been, and is, much teaching and preaching of æsthetics. Schools, periodicals and municipal art societies are doing much to educate the popular taste and to create a demand for beauty in public works and this campaign, whose influence is spreading rapidly, will undoubtedly bring designers to recognize and appreciate the necessity and propriety of combining beauty with utility in all visible constructions.

This problem will be greatly simplified in concrete work; for here for the first time we come to deal with a plastic material which can be moulded and modeled at will. Beauty, however, in structural design is worthy of the name only when, like beauty in nature, it has character. It must not be a servile copy of the style peculiar to some other material, but in fact must express the individuality of its own nature: it must not disemble.

It is just this peculiar condition that we must be careful of in our concrete-block architecture. At present the tendency in the manufacture of these blocks is to imitate the split face of stone ashlar. This is radically wrong in principle and should not be tolerated. A flat, smooth face will always look well. However, if a pitched or split face is desired, let it be produced by casting the block flat and then pitching off the face with chisel and hammer just as is done with stone. The clean fracture of the concrete thus exposed will be eminently effective and artistic and will have all the merit that belongs to truthfulness. Plain concrete ashlar walls might in some cases be effectively relieved by the introduction of bands of blocks decorated with some simple ornament moulded in the face, very much as is done with terra-cotta. But by all means avoid moulded rock-faced work. It is artistically bad. The frequent and constant repetition of a few regular sizes and patterns ruins an effect which should be counted largely as accidental, but always expressive of a fine artistic sense in the selection and grouping of the individual blocks. Artificiality, imitation and misrepresentation are stamped all over such work and can be recognized at first glance.

Solid concrete walls have a great advantage over block walls in that they lend themselves much more readily to artistic treatment. This is especially true where they are used in suburban and country buildings, perhaps because of the touch of nature in the surroundings which more nearly accords and harmonizes with the broad treatment that can be so effectively employed in wall-surfaces. Perhaps the best sources of inspiration that can be had for such treatment are to be found in the old Spanish missions of California, which, although not of concrete, nevertheless at once suggest its use and above all are fine examples of the artistic value of broad wall-surfaces relieved by exquisitely proportioned openings judiciously spaced and not infrequently embellished by a moderate use of ornamentation.

Let us sey, then, speaking of domestic architecture, that where walls are made of solid concrete the surfaces should be as unbroken as possible, avoiding especially artificial jointing, of which so frequent use is made, obtained either by scratching a joint into the fresh mortar with which the surface is plastered after the removal of the forms, or by planting beveled wood strips on the inner surface of the forms, thereby moulding the joint directly into the concrete.

Both methods are highly objectionable, utterly senseless and æsthetically very bad and should be shunned. In work of moderate cost, where effects are to be sought in an inexpensive, straightforward and natural way, there can be no offense taken if the concrete is left untouched after removing the forms. In fact, this method has so much merit that it might with perfect propriety be classed as the most thoroughly artistic. That is probably just what the builders of the old Spanish missions would have done, if they had had concrete to use for their buildings.

To be sure, if such treatment is to be used, some care should be exercised in the preparation of the form work, so that the result may not have the effect of a lot of patchwork.

In more pretentious work several methods of treating the exposed concrete are available. A thin skin or crust of neat cement usually is found to cover the surface where concrete was deposited wet and was well tamped. This crust may be removed while still soft by means of a stream of water having some force, or by stiff wire brushes, in which cases the forms must be removed promptly and just as soon as the work will stand it. This, however, involves considerable danger and should be done only by thoroughly experienced persons. If successfully accomplished, the effect of the rough surface thus produced is good and consistent, for it exhibits the material in its true nature and avoids all semblance of artificiality.

This treatment, however, entails so many difficulties that it will not be very popular, and it will be advisable to adopt some other simpler and safer method that will give similar results. The surfaces can be tooled all over with a chisel as in some classes of stonework; but while the result may be effective, it is rather expensive and slow work and will therefore be but sparingly used. It is difficult, too, to avoid loosening an occasional pebble or stone and thus spotting the surface with objectionable blemishes, and possibly opening up some internal cavities which are quite apt to occur, thus starting a leak in the wall.

A simple and inexpensive, yet thoroughly practical, method of securing an artistic effect consists of covering the wall-surface with a splatter-dash coat of cement-mortar applied by splashing it on with a paddle or a broom—or, better still, it may be first spread on with a trowel and then roughened by stippling with a stiff broom or brush, or even a flat board, in which case the roughening is obtained by suction against the board. When such treatment as this is to be used it may be highly appropriate in some cases and indeed quite interesting to decorate parts of the surface with some simple panel-work or free-hand modeling. In case of panels it is best and simplest to adopt sunken work, as this can be readily produced by merely planting a board or block of desired shape against the inside face of the form, so that it leaves its impress upon being removed from the concrete. Or else a reverse mould made of some artistic bit of carving for a panel, or over a door or window, or a frieze, etc., may be nailed against the forms, and the resulting impress will be thoroughly effective, although a much higher artistic value would be due such work if it were modeled by hand directly in the cement mortar as it is applied and before it has had a chance to harden.

This sort of work is being done extensively and successfully in Germany, where the modern style of "Art Nouveau" presents abundant opportunity for endless designs. It is already finding much favor in our own country and ought to reach a high degree of development.

Mouldings, especially in continuous courses, if attempted at all, should be of the simplest possible design; bold, yet of moderate projection and free from small delicate members. Square offsets and beveled projections serve very well in the place of conventional mouldings and rather accentuate the character of the work and heighten its effect. Dentils of fair size can be worked in to good advantage and with comparatively little difficulty. Such work should, however, be used sparingly on account of the impracticability of treating the surface of the resulting small members, unless great freedom and latitude are allowable without detriment to the artistic character of the design. It is particularly difficult to do this in case the walls are to be plastered over with cement mortar. Where this is done the work should be finished under the float rather than the trowel, so as to minimize the tendency to crack or craze, a great source of annoyance and disfigurement. Trowel finish, furthermore, almost invariably produces a series of blotches of different shades and textures which, if introduced into rough work, have much artistic value, but must be classed as nothing better than blemishes in smooth troweled surfaces. Moreover, it is extremely difficult and well nigh impossible in plastering over mouldings or projecting band-courses to keep the edges straight and true, as they should be in smooth finish, with the result that the poor, slovenly workmanship imparts an air of cheapness and flimsiness to the building instead of the reverse, value and substance. Such then are some of the readier methods that can be employed in producing artistic effects with concrete. This humble material, so replete with possibilities, but as yet so little understood, is manifestly destined to take an important place in the construction of our buildings and must therefore strongly influence their design. But it means long, continuous and close observance and study of its nature, its possibilities and its limitations, and if our designers will devote themselves sufficiently to this subject, as it so well deserves, they will discover in concrete a new and useful friend, and with its help will evolve a new architecture that will be full of life and character, strength and dignity and all else that goes to make a living style.

ENGINEERING ADVICE AS TO REINFORCED CONCRETE.[1]

YOUR Committee on Architecture considers it advisable to devote its annual report chiefly to reinforced concrete, on account of its increasing use for structural purposes in engineering and architecture.

This material is now regarded by the public generally as a panacea for all the difficulties and errors frequently made in construction, and also as cheaper and more economical than any system of equally substantial and durable construction. But certain precautions must be observed, or very serious accidents are certain to result from its use by inexperienced or careless men, especially by the "skin" contractor, and it may be well to mention some of the probable sources of trouble.

1. Quality of Materials.

When subject to inspection by competent superintendents, the cement will usually be fresh and of a reliable brand, the sand and aggregate will be free from clay and dirt, due proportions be used, and the method of mixing and tamping be reasonably efficient and uniform. Then the resulting structure can reasonably be expected to have the computed strength, which will increase for an unknown time, perhaps continually.

But many contractors prefer to believe that an addition of lime paste strengthens Portland cement, and, if this were true, more paste would make it still stronger, attaining a maximum strength without any cement at all. Of course the setting is delayed, but this is of less consequence in walls, where most of the contractor's experience has been gained. Owners of proposed structures know very little concerning the relative strengths of various brands of cement, and they are likely to consent to the substitution of an inferior grade, if the contractor offers a small discount on the cost of the work.

The aggregate also varies considerably, as crushed soft sandstone is sometimes supplied instead of hard limestone or granite. The contractor is also inclined to suggest coal cinders as much cheaper and just as good, while cinder concrete is entirely unfit for structural members, being only suitable for use as a mere filling.

2. Workmanship.

The wooden forms require to be true and to retain their shapes without deflection or bulging when the concrete is tamped in place. Concrete should always be mixed in a suitable machine, for the hand process is very uncertain, even when done under careful supervision. It must be tamped carefully and uniformly without displacing any part of the steel reinforcement, and this work must be done by experienced men, not by common laborers employed by chance.

3. Setting.

Since the wooden moulds are expensive and the owner desires the completion of the building at the earliest moment possible, there is always a temptation to remove the moulds too quickly in order to use them for a higher part of the structure. This should never be done, for it probably causes most of the serious accidents and sometimes the destruction of buildings, as frequently reported in the newspapers. Cracks are also likely to occur in the exposed surfaces of beams and floor-slabs, thus seriously weakening those members.

4. Protection from Concentrated Loads.

During the construction of a building the materials for the upper stories or the roof are frequently piled up in masses on the floors already built. This is perhaps safe while the forms are in place, since these are usually strongly shored and supported. But after these are removed, such concentrated loads generally cause a permanent deflection and may rupture the floor. The average laborer or mechanic regards a floor as similar to a solid ledge of natural rock, perfectly able to support any load that may be piled on it. Here, then, is a great risk to concrete structures, unless very carefully superintended.

5. Use of Steel Columns Enclosed in Concrete.

Although buildings consisting of several stories have been successfully built, in which the supporting piers or columns are of concrete reinforced by steel rods and bonds, only sufficient to prevent bending out of verticality, it is evident that for higher structures, or those exposed to heavy floor loads, the column loads should be borne by a steel column to which the floor beams are properly connected, and not be supported merely by a stiffened concrete pier. This is especially true in case the piers are exposed to side pressures or jolts or moving loads are carried on the floors.

6. Fireproof Interiors.

Interiors should be made fireproof. Reinforced concrete is merely incombustible, not fireproof, like terra-cotta or bricks. It is calcined to a considerable depth by exposure to great heat and is liable to be washed off by a stream of water, possibly exposing the steel to heat and certainly requiring extensive repairs. Therefore, as careful precautions should be taken as in case of a steel-frame fireproofed building to avoid wood finish, wooden partitions, wooden furniture, and accumulations of books and papers, which would supply materials for a destructive fire. Wired-glass, metal sash and metal-covered doors would also be excellent.

It is probable that these precautions are often impossible, and that a chief reliance must be placed on prompt extinguishment of any local fire before it has time to spread through the building.

7. Precautions against Frost.

Construction should not continue during freezing weather, and all completed work not fully set should be thoroughly protected from frost. The average contractor usually argues that a "frozen set" for plastering or mortar is even better than one without freezing. But this is certainly doubtful, unproven and to be avoided always. His argument merely tends to extend the season for his building operations and is therefore open to suspicion, especially since the experience of every architect reminds him of serious damages to his buildings by frost. Freezing certainly is likely to make the concrete less compact, cause cracks, and retard setting. The use of salt, hot water, heated sand and aggregate are merely palliatives to soothe the conscience of the superintendent. This danger will be most likely to occur in northern cities where the building season is too short for the amount of work to be done, and owners and contractors are willing to take almost any risk in order to complete the building and make it produce revenue at the earliest date.

These suggested dangers in the use of reinforced concrete show, in my opinion, that the use of this material should only be permitted under the direct supervision of a competent engineer or architect, and never be left to the mercies of an inexperienced contractor, who sometimes regards a structure as safe if it does not fall before his pay is received. Yet the chief danger would come from a failure to observe all of the preceding precautions, rather than through dishonesty in materials or workmanship.

With proper care in execution this material is certain to be widely employed for many kinds of structures, will be reasonably resistant to fire, and its strength will increase for a long time. It will doubtless take the place of wood construction for all the more important or expensive buildings, except tall fireproof office-buildings and department-stores. For these the loss of time in erection and the loss of rental would more than exhaust any saving in the cost of construction, not to mention the probable higher rate of insurance on the building and its contents.

In computing the safe strength of any proposed reinforced-concrete structure, the designer should be very conservative in applying formulas and data based on experiments made at testing-stations, where all precautions are observed and the work is done by experts in a manner far superior to that possible in actual structures.

Reinforced concrete was invented in 1868, in France, by Joseph Monier, a gardener, being first utilized by him in building a greenhouse. Its use extended very slowly, so that the material has been largely employed in France and Germany only during the past fifteen years for all classes of buildings, even for those of monumental character, covered by large domes and vaults. Few accidents have occurred, as the properties of the material have been carefully determined by experiments made by the most famous investigators in Germany and France. and the governments have made and strictly enforced stringent rules for the execution of the work. *Béton und Eisen*, a monthly journal of the most scientific character, contains numerous examples of recent structures, calculations of their safe strength, and discussions of all matters of interest.

To indicate the very careful regulations for reinforced-concrete construction, it may be of interest to quote a few points from the general order issued by the Prussian Minister of Public Works in 1904:

[1]Report of the Committee on Architecture: Illinois Society of Engineers and Surveyors.

"Complete drawings, calculations and specifications must be submitted in order to obtain a permit to build.

"Only Portland cement of the Prussian standard is allowed.

"Sample blocks must be tested.

"No concrete to be made in freezing weather, and concrete must be protected from frost.

"Side planks may be removed after three days, other forms and supports only after fourteen days.

"Structures must be approved by State building-officials.

"Rules, formulas and data are given, which must be employed in computing the safe strength of floor-slabs, beams and columns of reinforced concrete."

A Prussian building-ordinance is made to be obeyed strictly, not suspended at the request of an alderman or the order of a city council. It is evident that it would be almost impossible for a dangerous accident to occur in Prussia, and that this new material may safely be used there. There should be a State building law in Illinois requiring the minimum precautions necessary for safe building. Until such a law exists and is enforced reinforced-concrete construction should be executed only by competent engineers or architects. If left to the ordinary contractor serious accidents will certainly occur, casting undeserved odium on a very useful and promising method of construction.

Mr. F. Oswald, of this committee, reports that he has completed the Madison County Almshouse, consisting of concrete basement and two stories of brick; floors steel I-beams and reinforced concrete, iron stairs, the latter item increasing the cost of wooden stairs about forty per cent. The floors are finished with a ¾-inch coat of Portland cement and crushed granite screenings, half-and-half, excluding the use of wooden floor for sanitary reason and fire protection. In dormitories, floors will be covered with heavy linoleum or matting.

The average cost of walls per cubic yard of different materials he found to be as follows:

For solid walls of concrete of one Portland cement, two sand and five crushed stone, the cost, including boxing for the forms, is $5.40 to $6.00 per cubic yard, with safe crushing load of 150 pounds per square inch.

The cost of coursed rubble stonework per cubic yard is as follows:

Good quality of stone delivered at building site...........	$2.75
Mortar, one part Portland cement, 2-3 barrel at $2.00......	1.33
Two parts sand, 7 cubic feet at $1.00......................	.25
Coursed stone, mason's work.............................	2.75
	$7.08

Safe resistance 300 pounds per square inch.

Common rubble masonry with lime mortar costs $5.00 per cubic yard.

Safe resistance 180 pounds per square inch.

Good hard red bricks, delivered, cost $8.00 per thousand.

Per cubic yard, 500 bricks..................................	$4.00
Mortar, one part Portland cement, ¾ barrel at $2.00.......	1.50
Two parts sand, 1-5 cubic yard at $1.00..................	.25
Brick-mason's work at $5.00 per thousand, measurement 600.	3.00
	$8.75

Safe resistance 200 pounds per square inch.

Common brickwork for internal walls in lime mortar costs $6.00 per cubic yard.

Safe resistance 150 pounds per square inch.

Comparison of Cost and Safe Strength.

Concrete per cu. ft. 22 cts., safe strength per sq. ft. 10.8 tons, cost	20.3 cts.
Coursed stone Portland cement 26 cts., safe strength per sq. ft. 21.6 tons, cost.................................	12.0 cts.
Common stonework in lime mortar 18½ cts., safe strength per sq. ft. 12.9 tons, cost............................	15.5 cts.
Hard bricks in Portland cement mortar 32.4 cts., safe strength per sq. ft. 14.4 tons, cost....................	22.5 cts.
Common bricks in lime mortar 26 cts., safe strength per sq. ft. 10.8 tons, cost.................................	24.0 cts.

This table shows that stonework is cheapest, considering the comparative safe strength.

THE TREATMENT OF CONCRETE SURFACES.[1]

A PLEASING and consistent surface finish generally has but little to do with the strength of a concrete structure, but it is not inconsistent with maximum strength in any structure.

Next to form or design, the character of the surface has most effect on the appearance of concrete, whether in a building arch, wall or abutment, in fact, when the view is had at a very close range, or in such structures as retaining-walls or pavements the surface finish may take precedence over proportion.

It is not intended to atempt a full discussion of the subject, but only to describe some methods used in trying to obtain satisfactory surfaces in the various classes of concrete work done in the South Park system of Chicago.

The imperfections in the exposed surfaces of concrete are due mainly to a few well-known causes which may be summed up as follows:

1. Imperfectly made forms.
2. Badly mixed concrete.
3. Carelessly placed concrete.
4. Efflorescence and discoloration of the surface after the forms are removed.

Forms with a perfectly smooth and even surface are difficult and expensive to secure. Made of wood, as they usually are, it is not practical to secure boards of exact thickness, joints cannot be made perfectly close, the omission of a nail here and there allows warping and the result is an unsightly blemish where least wanted.

Badly mixed concrete gives us irregularly colored, pitted and honeycombed surfaces, with here a patch of smooth mortar and there a patch of broken stone exposed without sufficient mortar. Careless handling and placing will produce the same defects.

But granting we have the best of labor, that all reasonable expense and care is had in making up forms, in mixing, handling and placing the concrete, that it is well spaded, grouted, or the forms plastered on the surface, the results are not satisfactory. All these efforts tend to produce a smoothly mortared surface, and the smoother the surface the more glaring become minor defects. The finer lines of closely made joints in the forms become prominent, the grain of wood itself is reproduced in the mortar surface, hair-cracks are liable to form, and worst of all, efflorescence and discoloration are pretty sure to appear. We surely have been working on a wrong theory.

It is of doubtful efficiency to line the forms with sheet metal or oilcloth. Imperfections still appear.

Two methods suggest themselves as likely to overcome the defects alluded to above. (1) Treating the surface in some manner after the forms are removed to correct the defects, and (2) using for surface finish a mixture which will not take the imprint of and which will minimize rather than exaggerate every imperfection in the forms and which will not effloresce.

Methods of treating the surface by bush-hammering, tooling and scrubbing with wire brushes and water have been described in various published articles, all of which have for their object the removal of the outer skin of mortar in which the various imperfections exist. But the method most used in the South Park work is the acid treatment. It consists of washing the surface with an acid preparation to remove the cement and expose the particles of stone and sand, then with an alkaline solution to remove all free acid, and finally giving it a thorough cleansing with water. The operation is simple and always effective. It can be done at any time after the forms are removed, immediately or within a month or more. It requires no skilled labor—only judgment as to how far the acid or etching process should be carried. It has been applied with equal success to troweled surfaces, like pavements, to moulded forms, such as steps, balusters, coping, flower-vases, etc., and to concrete placed in forms in the usual way. It, of course, means that in the concrete facing only such material shall be used as will not be affected by acid, such as sand or crushed granite. It excludes limestone.

The treated surface can be made any desirable color by selection of colored aggregates or by the addition of mineral pigments. The colors obtained by selection of colored stone are perhaps the most agreeable and doubtless more durable.

There have been moulded in the South Park shops blocks for buildings, columns, architectural mouldings and ornaments with both red and black crushed granite, all treated with the acid to

[1]A paper by Linn White, Engineer South Park Commissioners, Chicago, Ill.

bring out the natural colors of the stone. There has been a large quantity of concrete pavement laid with torpedo sand surface colored a buff sandstone color with a small quantity of yellow ochre and mineral red and treated with acid. The buff color imparted to the surface is a welcome relief from the glare of the ordinary whitish gray concrete pavement in the sunshine, and the etching of the surface adds to the softness of the color, at the same time preventing any slippiness. This same buff color has been used to a large extent in steps, bases of lamp posts, and other moulded articles to be placed on or near the ground. With sand as the aggregate thousands of pieces have been moulded for coping, balustrades, concrete seats, drinking fountains, pedestals, etc., which, when treated with the acid, appear like fine grained, almost white sandstone.

Where there are projections or marks left by the moulds or forms they are tooled or rubbed down before treatment, and where it is necessary to plaster up rough places or cavities in the surface it may be done after treatment and cannot be detected.

These various classes of work have been done on a large scale during the last three years in connection with the improvement of new parks and has in all cases proved satisfactory.

The second method of preventing or minimizing surface defect has also been tried in the South Park work with quite a measure of success.

During the years 1904, 1905 and 1906 groups of concrete buildings have been erected in nine different parks, costing, with their accessories, from $65,000 to $150,000 for each group. These buildings are all monolithic structures with occasional expansion-joints, the exposed surfaces of walls being of concrete composed of one part of cement, three parts of fine limestone screenings and three parts of crushed limestone known as the one-fourth-inch size. This was thoroughly mixed quite dry so no mortar would flush to the surface and well rammed in wooden forms made in the usual manner. The result was an evenly grained, finely honeycombed surface, of a pleasing soft gray color, which grows darker with time and blends admirably with the park landscape. In placing it was not spaded next the form; it was too dry to cause any flushing of mortar, so there is no smooth mortar surface, the imprint of joints between the boards is hardly noticed and the grain of the wood is not seen at all. There is no efflorescence apparent on the surface anywhere and cannot be on account of the dryness of the mixture and the porosity of the surface. The buildings are used as gymnasiums, assembly-halls, reading and refreshment rooms, and as a rule the same gray concrete finish is given the interior walls as the exterior. In some cases a little color has been applied on the interior walls and the walls of shower and bath-rooms have been waterproofed with plaster. The porosity of the surface makes it well adapted to receive and hold plaster.

This sort of surface is not capable of treatment with acid as a smoothly mortared surface, nor is it desirable. Consequently the only color obtainable is the natural color of the cement-covered stone, but which is softer and far more agreeable than the gray of the usual mortar-finished surface. It is not suited for the surface of a pavement and is not impervious to water. Although it is evident the water enters the pores to a considerable extent there is no evidence of injury from the frost during the two winters some of the walls have stood.

The same finish has been used for retaining-walls, arch bridges, fence-posts, walls enclosing surface yards, etc. In the buildings the thin walls were made entirely of this mixture, while in the heavier structures it has been used only as a facing. Two reinforced arches of 60 feet span were faced with this mixture, but the steel was imbedded in a wetter, more impervious concrete. This same dry mixture can be used for moulded stones when the mould is open enough to permit tamping, and of course it is eminently suited to block machines.

The dry, rich mixture, with finely crushed stone, has been found specially suited to another condition where a sound, smooth surface was particularly difficult to secure, *viz.*, for the underwater portion of a sea-wall on Lake Michigan. It was mixed very dry and dumped in mass in sunken boxes joined end to end, made fairly watertight, but from which the water was not excluded.

With the finely crushed stone a sound, smooth surface was obtained (when the sides of the boxes were removed) where it was manifestly impossible to plaster or grout the surface and where spading a mixture of coarser stone simply washed the cement away from the surface stones. On account of the variable water-level it was particularly desired to have a sound, smooth surface.

Of the work described, most of the monolithic buildings, the arch bridges and some of the walls and paving have been done by contract. All of the moulded work, the buildings made of blocks, service yard walls, etc., and all the acid treatment has been done by the park forces. Nearly all the various brands of Portland cement sold in the Chicago market have been used in varying quantities with equally good results.

In both methods described honest work and careful inspection are as necessary for good results as in any other first-class construction. Neither method cheapens concrete work. The acid treatment slightly increases the cost. The surfacing with fine crushed stone adds nothing to the cost.

By the acid treatment, together with rubbing and chipping, all irregularities can be corrected. With the fine crushed stone surface all irregularities and form marks are not prevented, but they are greatly minimized.

In not all the work done by the second method were the results entirely satisfactory. The original specifications called for ½-inch stone, which was afterward changed to ¼-inch. Experience taught the correct quantity of water to use for best results. But altogether both methods are so satisfactory that their use will doubtless be continued in the South Park work until something better is developed.

THE DEFECTS AND VIRTUES OF REINFORCED CONCRETE.

DURING the discussion of a paper on Reinforced-Concrete Construction, read before the Engineers' Club of Philadelphia, October 6 last, Mr. Wm. Copeland Furber spoke as follows:

THE history of reinforced-concrete construction deserves the most careful study on the part of structural designers. Reinforced concrete has successfully met the charges of its critics and confounded many of the prophets who predicted nothing but failure for its portion. It is to-day recognized as one of the four methods of structural design, and these methods can be named in the probable order of their historic employment, viz., wood, masonry, iron and, lastly, reinforced construction of iron and concrete. The evolution of the theoretical design of reinforced construction has been slow, largely because the engineering students were not quick to realize that the adhesion of concrete to metal could be used as a factor in determining the transfer of stresses from one material to another. The value of rivets and bolts to transmit stresses could readily be calculated, because the facts were easily ascertained and easily proved, but the ability of the concrete in a beam to transmit the web stresses to a horizontal metal reinforcement or flange was not so readily comprehended. The definite certainty of riveted connections made it difficult to even think, let alone admit, that such a material as concrete could be trusted to transfer stresses to iron bars or rods, although it was quite easy to prove by trial that such a capacity existed. Theoretical objections to this proposition gave way, upon trial, to new conceptions based upon the newly discovered facts, and then the new theories appeared which embraced these facts.

With the advent of reinforced concrete, came the inevitable accompaniment of all things of a more or less mysterious nature: the quacks, who made many claims for the new material and whose real knowledge of the subject was purely empirical. The quack designers and the quack builders have done much to delay the final acceptance of the new combination, as a proper and legitimate form of structural design, and even now the unreasoning and unreasonable advocates of this new form of construction will not admit that this form of construction has any defects worthy of mention.

Reinforced concrete has, like all other good things, the defects of its virtues, and no intelligent designer can allow these defects to pass unnoticed, if he aims to keep his mind free from prejudice. Reinforced concrete deserves a high place as a method of construction, and with the growing scarcity of lumber its employment has become a practical necessity. It is also a step in the direction of the erection of permanent buildings with a resultant decrease in the fire-hazard and a lessening of the spendthrift fire-waste of which this country is the chief exponent. For this reason, if no other existed, the new construction can be hailed as a Godsend.

There is, perhaps, no material used in construction in which the workmanship factor so largely enters. We may inspect iron, wood, brick, stone, etc., and accept them or reject them as they meet or fail to meet our requirements, for they are

finished units of construction, but while the separate component parts of the concrete are definite things, yet in their combined form they become a new chemical and mechanical substance which may be good or bad according to the intelligence and care used in mixing, placing and protecting them until a proper setting has taken place.

There are several prevalent superstitions among the ordinary workers in concrete that seriously operate against the probability of good results being obtained unless the work is most carefully supervised. One of the superstitions is that cement possesses some magical property that enables a very small quantity to go a long way, or in other words, that it takes but a "little to leaven the lump" of sand and stone, and these same workmen think that they are doing their "boss" a good turn when they "skin" on the quantity of cement.

Another delusion is that "drying" and "setting" are coincident, and that the first must occur before the second has happened. I suppose that reasoning from the setting of other materials, like paste, mucilage, glue, varnish and other materials of like nature in which water or alcohol is the solvent, it is natural for them to suppose that cement must dry before it sets, and this belief causes no end of trouble, unless it is most carefully guarded against. I was called upon to investigate, last fall, two concrete structures which failed largely through the belief on the part of the foreman of each job that the concrete should be allowed to dry out as fast as possible. Their efforts in this direction were aided by high winds and the cold weather, which retarded the setting. In one instance, several buildings of a group and in another the floor system of a city-hall collapsed. The contractor placed the failure on the cement and threatened to sue the cement manufacturer for damages, but a little investigation showed that the failure in both instances was due to the belief on the part of the foreman on each job that rapid drying was not only desirable but essential to the setting of the concrete. Had the foreman in each case known the fundamental chemical necessity for water during the setting, this failure would not have occurred.

Another great drawback to the use of concrete work is the uncertainty as to whether some careless, ignorant, or designing workman may not have spoiled the work at a critical point by improper methods or materials, and no subsequent inspection is going to detect this weakness until it is possibly too late to remedy it.

Carelessness, indifference and irresponsibility seem to be the order of the day, and this is particularly so in the building trades. Where materials can be inspected after erection, as in brickwork, stonework, ironwork, etc., it is very hard to get even passably good results, but with a material that has to be taken on faith, like reinforced concrete, it requires a perpetually optimistic temperament to prevent undue anxiety from spoiling one's peace of mind.

Regarding the ignorance of the ordinary workers in concrete concerning the chemical value of water in the setting of cement, it should be remembered that cement is a chemical product and requires some brains to make proper use of it. When it was deposited in large masses, the chances of drying out, too rapid setting, and the disturbing of the mass due to vibration, were not great, but in reinforced-concrete construction these dangers are ever threatening.

PEERLESS LAUNDRY BUILDING, MOBILE, ALA.
George B. Rogers, Architect.

Every portion of this building, from foundation to roof, smoke-stack as well as stairs, is of reinforced concrete. There are 27,000 square feet of flooring, and the front girders have a clear span of 50 feet. The stucco finish of the main front is applied directly to the rough concrete. The side walls are 4 inches, and left as they come from the forms.

As a step in the education of the uninformed workers in cement, I would earnestly suggest to the manufacturers that they attach a tag to each bag or barrel of cement giving in a concise manner the essential facts regarding the use of water in the mixing and setting of cement. Thus, without any great effort, each man who handled the bag of cement would unconsciously perhaps become a missionary in spreading the knowledge of how cement should be used, and better work would follow and more cement would be used, and thus the manufacturer would reap an advantage for his altruistic labors in a material and pecuniary way.

The fireproofing of concrete structures is one that deserves as much study as the fireproofing of iron structures. The advocates of reinforced-concrete construction do themselves no credit and do their material a great deal of harm by claiming that concrete is a fireproof material. The simplest tests which can be made by a school-boy will prove that cement, after setting, cannot resist fire without detriment, and the point of absolute structural disintegration is determined solely by the length of time it is kept in contact with the fire. A few briquets, the kitchen-range and a bucket of water will prove this in a most practical and satisfying way, and remove any lingering doubt one may have on the subject. Chemically, this conclusion can be justified by recalling that in the setting of cement from ten to twenty-five per cent. [of water] is crystallized into the new mixture and remains there, not in the form of dampness—for the material can be perfectly dry—but as a chemical compound of the mass, and knowing this it can also be shown that this combination can be broken up and separated again by heat, which brings the cement back to somewhat the original form it had before being mixed with water. All this being proved or admitted, it is next in order to find a method to protect the concrete from reaching high temperatures, and our experience in fireproofing ironwork will help us in this direction. Porous fire-clay blocks are useful as a slow conductor of heat and they will also withstand high temperatures without changing their chemical composition, and in addition their porous nature gives them the ability to resist sudden changes of temperature without fracture. By protecting the structural parts of the construction with this material it is possible to construct a building of great fire-resisting capacity at a cost considerably less than if structural steel fireproofed with the same material were to be used.

The porous-terra-cotta manufacturers have provided a material which can be easily laid with the centering and which unites with the concrete, forming a monolithic structure with a protecting surface of porous fire-clay terra-cotta.

The application of reinforced concrete to mill structures, which have heretofore been built of large sticks of lumber, helps wonderfully in the direction of better buildings. Large sticks of lumber are becoming very hard to obtain, and even when they can be obtained in good condition the subsequent checking of the wood seriously impairs their strength and capacity. Before the advent of reinforced concrete there was but one other way to obviate this and that was by the employment of structural

ironwork. In reinforced concrete we have a material which is particularly suited to commercial structures of all kinds, but in the employment of any composite material like reinforced concrete eternal vigilance is the price of safety.

THE LITERATURE OF REINFORCED CONCRETE.

THE increasing use of reinforced concrete as a structural material has led to the production of many books treating of its properties and applications.

The first to be published written in English (omitting the brief analysis of reinforced-concrete beams in the late Prof. J. B. Johnson's *"Materials of Construction"*) was *"Reinforced Concrete Construction,"*[1] by L. J. Mensch. The author is a practical designer of and a contractor for this method of construction, and he writes as an advocate, first, of reinforced concrete as a superior substitute for other structural materials, and, second, of certain forms or systems of reinforcement. But, while largely an argument for the practices and opinions of the author, the book contains many suggestions for the constructor.

The next book in order of publication was *"Reinforced Concrete,"*[2] by A. W. Buel and C. S. Hill. This work, of which a revised edition will soon appear, is a general treatise on its subject. It aims to give equal prominence to computation, design and methods of construction. Part I. states and discusses formulas and methods of calculation for beams, columns, walls, arches, conduits and tanks, and sets down those facts relating to the properties of concrete and steel which are of most use to the designer. Part II. describes and illustrates forms and types of structures that have been built of reinforced concrete. Part III. describes various forms of reinforcement and the methods of construction employed in foundation-work, bridges, buildings, conduits and tanks.

To the general reader Part II. will probably prove the most interesting part of the book. It describes perhaps two hundred reinforced-concrete structures: foundations, piles, floors, columns, walls, roofs, sewers, aqueducts, tanks, bins, arches, dams, chimneys. About two hundred drawings illustrate this portion of the text, and these are fully dimensioned. The structures shown are not critically discussed, the idea being to place actual structural details before the reader in such variety and number that he may be practically sure of finding something about any particular detail in which he is interested and may see how it has been worked out by other designers.

The hundred pages of Part III. are intended principally for the contractor. They tell briefly of the quantities and composition of concrete, describe various kinds of reinforcement and illustrate forms and methods of concreting for foundations, buildings, bridges, tanks, reservoirs and conduits. This part has a final chapter on methods of facing and finishing exposed concrete surfaces.

"Reinforced Concrete,"[3] by Charles F. Marsh, was first published in England. Like the American work just reviewed, it is an attempt to cover the whole field of reinforced concrete—computation, design and construction. The author has, however, derived his information chiefly from the practice of Continental Europe; in fact, comparatively little of the book, aside from the author's deductions, is of English origin. This is doubtless due to the fact that the British building laws and ordinances are or were such as almost to prohibit this form of construction. The book is divided into seven parts. Part I. reviews the subject in general and discusses the advantages and disadvantages of reinforced concrete. The ninety pages of Part II. are devoted entirely to descriptions and illustrations of systems of reinforcement. Some fifty systems are considered, and the reader who desires to see the versatility of invention in this particular will find this part an interesting study. Part III. treats of materials and their combination and deals entirely with European practice. The sixty pages of Part IV. are devoted to forms, falseworks, methods of concreting, forms of reinforcement, and the facing and finishing of surfaces. One of the most suggestive sections of this part deals with the molding of members before putting them in place. Part V. presents the data resulting from the experimental researches of the European experts and the constants of strength, elasticity, adhesion, etc., recommended by the author for use in computation. Part VI. discusses methods of calculation. The author presents first his own analyses and formulas and follows with those of Hennebique, Ritter, Considère, Christophe and others. It is for this part and for Part V. on tests and Part II. on systems of reinforcement that the book is to be chiefly commended. In Part VII. there are assembled a large and rather miscellaneous list of descriptions and illustrations of reinforced-concrete structures.

Next in order of publication come two American books, whose similarity of scope makes it most convenient to consider them together. These are *"Concrete, Plain and Reinforced,"*[4] by F. W. Taylor and Sanford E. Thompson, and *"Cements and Concrete,"*[5] by C. L. Sabin. In each of these the consideration of reinforced concrete is an incidental feature of a general treatise on cement, mortar and concrete. Briefly characterized, the latter is particularly strong in its discussion of cement-testing and its presentation of original results of tests of cements, mortar and concrete, while the former is a thorough and generally excellent work on the making and practical handling of concrete. Most of the rules laid down in these books for the mixing, handling and placing of concrete are quite pertinent to work in reinforced concrete and are presented with far more thoroughness than in any of the books dealing especially with that material. The need for a strong and reliable concrete is so imperative in reinforced-concrete construction that this feature makes the books in question of particularly great value to the constructor. Both books begin by describing and classifying the various hydraulic cements, and contain instructions for testing, results of tests, directions for choosing sand, and aggregates and for proportioning mixtures, and directions for mixing and placing concrete in building-work, piers, dams, retaining-walls, arches and other structures.

In the next book, *"Concrete-Steel,"*[6] by W. Noble Twelvetrees, a well-known English structural engineer, no attempt is made to cover the subject of reinforced concrete and its application to construction. The work is rather a discussion of fundamental principles. Beginning with a statement of the physical properties of concrete and of steel and of concrete and steel in combination, the author then takes up the theory of reinforced concrete and gives rules for correct design and calculation of strength and practical examples of the chief types of members employed in construction. His presentation of the subject is excellent in all cases; but it is unfortunate that many of the data accepted by him are matters in dispute or have been discredited by more recent investigations.

"A Handbook on Reinforced Concrete,"[7] by F. D. Warren, is the only book on this subject which has so far appeared in 1906. Part I. is introductory and contains references to provisions for securing good construction. Part II. has sixty-seven pages devoted to tests of beams, floors and roofs; which tests, according to the author, justify the use of certain constants and coefficients used in his tables. Part III. contains tables giving safe loads, bending moments, deflection under load, etc., for beams, floors and columns, and also the comparative cost of reinforced concrete, cast iron, steel and timber construction. Part IV. gives similar information for roof-trusses up to 125 feet span. The idea of making up the publication in handbook form is a good one; it is all the more to be regretted that the author is, in the reviewer's opinion, frequently in error in his assumptions and his reasoning. The book is therefore one which it would be unsafe to put in the hands of the inexpert.

In addition to these seven more or less complete and general works, there are others which take up special phases of reinforced-concrete construction. First is Prof. William Cain's little book on *"Concrete-Steel Arches,"*[8] which is a discussion of the analytical and graphical calculation of arches. Next comes Mr. Leon S. Mossieff's translation of Considère's papers and their compilation in a book entitled *"Experimental Researches on Reinforced Concrete."*[9] The subjects treated in these papers are: Reinforced concrete in bending; the deformation and testing of reinforced-concrete beams; effects of changes of volume of con-

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[1]"Reinforced Concrete Construction," by L. J. Mensch. Chicago: William Seafert. Price, $2.

[2]"Reinforced Concrete." Part I.—Methods of Construction, by A. W. Buel. Part II.—Representative Structures; Part III.—Methods of Construction, by C. S. Hill. New York: The Engineering News Publishing Company. Price, $5.

[3]"Reinforced Concrete," by Charles F. Marsh. New York: D. Van Nostrand Company. Price, $7.

[4]"A Treatise on Concrete, Plain and Reinforced," by F. W. Taylor and Sanford E. Thompson. New York: John Wiley & Sons. London: Chapman & Hall, Limited. Price, $5.

[5]"Cement and Concrete," by L. C. Sabin. New York: McGraw Publishing Company. Price, $5.

[6]"Concrete-Steel," by W. Noble Twelvetrees. London: Whitaker & Company. New York: The Macmillan Company. Price, $1.90.

[7]"A Handbook on Reinforced Concrete for Architects, Engineers and Contractors," by F. D. Warren. New York: D. Van Nostrand Company. Price, $2.50.

[8]"Concrete Steel Arches," by Prof. Wm. Cain. New York: D. Van Nostrand Company.

[9]"Experimental Researches on Reinforced Concrete," by Armand Considère. Translated and arranged by Leon S. Mossieff. New York: The McGraw Publishing Company. Price, $2.

crete; tensile and compressive resistance of reinforced concrete; resistance of concrete to shearing and sliding; effects of cracks, and compressive resistance of hooped and reinforced concrete. These books of Cain's and Considère's are essentially books for the computer and designer.

The constructor will find his needs specially considered in Mr. H. P. Gillette's *"Handbook of Cost Data,"*[10] some 140 pages of which useful work are devoted to records of costs of materials, forms, mixing, handling, depositing and finishing.

The highest and earliest development of reinforced-concrete work occurred in France and Germany, so that the foreign literature of the subject should not be overlooked. Probably the best general treatise is *"Le Béton Armé,"*[11] by Paul Christophe. This book covers computation, design and construction. Part I. discusses general principles and systems of construction. Part II. describes and illustrates the application of reinforced concrete to buildings, bridges, reservoirs, etc. Part III. has to do with the execution of work in this material. Part IV. discusses the theory and methods of calculation. Part V. treats of the advantages and disadvantages of reinforced concrete as a structural material.

The great advantage—particularly to the author of a technical book—of having the last word has been utilized by Mr. Homer A. Reid, in his *"Concrete and Reinforced-Concrete Construction."*[12] The first six chapters of this nine hundred page book contain some historical matter and a discussion of materials, and methods of proportioning ingredients and mixing and placing concrete. Chapter VII. analyzes the factors that affect cost, and chapter VIII. treats of the finishing of concrete surfaces. Nearly a hundred and fifty pages are devoted to the application of reinforced concrete to building construction. This feature of the book and the fact that Mr. Reid presents the general theory of reinforcement as applied to beams, slabs and columns with unusual clearness and conciseness are what cause the work to be of exceptional interest to architects.

A BOOK ON THE SAN FRANCISCO DISASTER.

THIS work,[13] covering two hundred and seventy large pages, is really a report made to the board of directors of the Roebling Construction Company by its expert engineer. But although Mr. Himmelwright's investigation was doubtless undertaken primarily for business reasons, the whole report gives evidence of impartiality and of careful observation leading to just conclusions.

The first thirty pages contain a historical account of the earthquake and a general discussion of the effects of shock and conflagration on buildings of various classes. Following this is a detailed report on the "Class A" or fireproof buildings. Some seventy-six such structures were studied and the damage done to each is separately chronicled. A hundred and fifty full-page photographic views make clear the points brought out in the text.

The conclusions which Mr. Himmelwright draws from his observations are set down under the following seventeen heads:

THE LESSONS OF THE FIRE.

I. Protect the openings of the outside walls against the exterior fire hazard.

II. Protect the columns and other important structural members in proportion to the requirements.

III. Use refractory materials for the façades.

IV. Select a concrete floor-construction of recognized strength and fire resistance.

V. Adopt reinforced-concrete for partitions.

VI. Never permit pipes inside the column protection.

VII. Provide metal treads for stairways.

VIII. Provide for the expansion of steel lintels and mullions.

IX. The filling between the floor arches and the under side of the finished floor should never be omitted.

X. Avoid light supports and copper wire in metal lath-and-plaster ceiling construction.

XI. Small steel vaults and fireproof safes proved ineffective in preserving their contents.

THE LESSONS OF THE EARTHQUAKE.

XII. Avoid locations in close proximity to geological fault lines.

XIII. The foundation must be capable of moving as a unit.

XIV. Adopt the steel skeleton frame method for the superstructure.

XV. The best materials and workmanship only are admissible for wall construction.

XVI. Avoid high chimneys and towers of plain masonry.

XVII. Roofing tiles should be thoroughly anchored in position.

Other and different lessons might be learned from the data which are supplied by the author, but the book as a whole is the most complete record available of the condition of the San Francisco buildings after the great earthquake and fire.

ILLUSTRATIONS

THE AUTOMOBILE CLUB OF AMERICA, WEST 54TH STREET, NEW YORK, N. Y. MR. ERNEST FLAGG, ARCHITECT, NEW YORK, N. Y.: EIGHT PLATES.

This building, a reinforced-concrete skeleton, is faced with terra-cotta. A fairly successful attempt at polychromatic effect has been arrived at by introducing low-toned slip-covered terra-cotta in the modelled work about the entrance and the great windows of the first story.

THE ADMINISTRATION BUILDING OF THE GEORGE N. PIERCE COMPANY, BUFFALO, N. Y. MR. GEORGE CARY, ARCHITECT, BUFFALO, N. Y.: SIX PLATES.

BUILDING OF THE EASTMAN KODAK COMPANY, WEST 23RD STREET, NEW YORK, N. Y. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

In this case the reinforced-concrete skeleton construction is veneered on the street front with terra-cotta.

HOUSE OF ALFRED MITCHELL, ESQ., PORT ANTONIO, JAMAICA, W. I. MESSRS. CHAPMAN & FRAZER, ARCHITECTS, BOSTON, MASS.

This reinforced-concrete building endured without injury the earthquake spasms that wrecked Kingston and other places, a few months ago.

HOLY TRINITY CHURCH, HAVANA, CUBA, W. I. MESSRS. CRAM, GOODHUE & FERGUSON, ARCHITECTS, BOSTON, MASS.: SIX PLATES.

While the structural parts of this building are of reinforced-concrete, the columns, doors and window finish and all other moulded decorative portions were cast in cement separately and built into slots, recesses, etc., provided for them in the mass work.

EPISCOPAL CATHEDRAL, MANILA, P. I. MESSRS. STURGIS & BARTON, ARCHITECTS, BOSTON, MASS.: FOUR PLATES.

With the exception of the roof, this building is of reinforced-concrete construction.

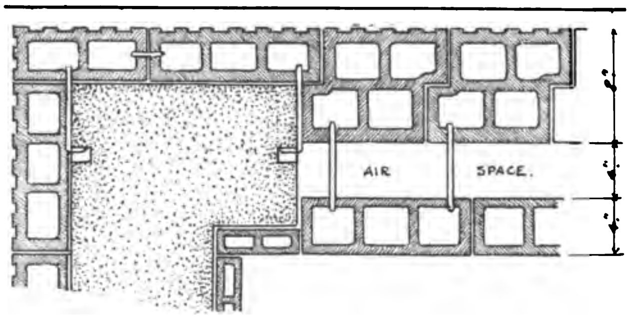
PARISH-HOUSE OF THE EPISCOPAL SOCIETY, MANILA, P. I. MESSRS. STURGIS & BARTON, ARCHITECTS, BOSTON, MASS.

MERCHANTS' NATIONAL BANK BUILDING, NEWARK, N. J. MR. CHARLES P. BALDWIN, ARCHITECT, NEWARK, N. J.: TWO PLATES.

In this case the reinforced-concrete structural parts are veneered with stone work.

HOUSE OF P. A. ROCKEFELLER, ESQ., GREENWICH, CONN. MESSRS. HISS & WEEKES, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

We regret extremely that our reproductive process has done such scant justice to the very admirable and thoroughly prepared



drawings which were prepared for this building. The architects have taken unusual care and efficient precautions to make the walls of the building not only fireproof, dampproof, and soundproof, but airproof as well. The accompanying diagram de-

[10] "Handbook of Cost Data for Contractors and Engineers," by Halbert P. Gillette. New York: Myron C. Clark Publishing Company. Price, $4.

[11] "Le Béton Armé et ses Applications," by Paul Christophe. Paris: Ch. Beranger. Price, $7.

[12] "Concrete and Reinforced-Concrete Construction," by Homer A. Reid, Assoc. M. Am. Soc. C. E., Assistant Engineer, Bureau of Buildings, New York City. New York: Myron C. Clark Publishing Company. Price, $5.

[13] "The San Francisco Earthquake and Fire. A Brief History of the Disaster. A Presentation of Facts and Resulting Phenomena, with Special Reference to the Efficiency of Building Materials. Lessons of the Disaster." By A. L. A. Himmelwright, C.E., M. Am. Soc. C. E. New York: The Roebling Construction Company.

clares clearly that the comfort of the inhabitants is, in an unusual degree, not likely to be much affected by changes in the external temperature.

THE CHÂTEAU DES BEAUX-ARTS, HUNTINGTON, LONG ISLAND, N. Y. MESSRS. DELANO & ALDRICH AND MAURICE PRÉVOT, ARCHITECTS, NEW YORK, N. Y.: EIGHT PLATES.

This establishment, which is to combine a hotel with restaurant, casino, bathing-pavilions, garage, villas, etc., is located on Huntington Bay. The site begins at the water's edge with a bluff and continues to rise back the full depth of the property, which is about one-half mile. On the edge of the bluff at the water's edge to the Casino. About two hundred feet back from this are the main buildings of the hotel. Back of the hotel buildings, on a level stretch, will be the polo-grounds, tennis-courts, and a field for all sports. Farther back the ground rises rapidly and lends itself very aptly to the scheme which incorporates a number of villas, so placed that each one will have a clear view overlooking the harbor and the Sound. The garage, which will accommodate fifty automobiles, is located on the east side of the property alongside of the road. This road is sixty-six feet wide and will connect directly with the new "automobile speedway," which is now in the course of construction.

The establishment being thus located should prove a rendezvous for automobile-tourists and yachtsmen. It is to be treated in somewhat the same manner as certain French establishments, such as the Pré-Catalan in the Bois de Boulogne, and is being erected for the owners, Messrs. Bustanoby Bros., of the Café des Beaux-Arts, New York City.

The central feature is the main hotel building, with two wings devoted to sleeping apartments, each containing sixty rooms. Each room is complete with bath and toilet and is so constructed that it will be absolutely sound-proof. This group of buildings is located about two hundred and fifty feet from the water's edge and overlooks the Casino and the bay.

In front of these buildings, on the water's edge, is located the Casino with its café, dining-room, private dining-rooms and billiard-rooms, all opening on broad terraces built over the sea-wall. On the roof is an open garden. The Casino is connected with the main building by underground tunnels.

Between the Casino and the Main Buildings, there is a terrace in the guise of a formal garden, located in which will be small pavilions in which meals will be served. These pavilions will be reached through underground passages from the kitchen, the Casino and the Hotel.

The parts of this establishment that will be open to the public this spring are the Casino, the east wing of the Hotel group and the garage. On the site of the main hotel building, there now stands what was formerly known as "Locust Lodge." This has been remodelled entirely and handsomely refurnished and will be used in connection with the other buildings this season.

All of the buildings in connection with this establishment will be fireproof, being constructed throughout of reinforced-concrete, using both the column and girder and solid slab construction.

The exterior of the buildings will be finished in stucco, all of the cornice and ornamental work being in cement. The architects, as will be seen on the accompanying drawings, have been especially careful in designing the structural concrete work so as to permit of the mouldings and cornices being run directly thereon. All of the ornamental work will be cast in cement from models executed from the architects' drawings. Considerable of this casting will be done directly on the works. Special care has been exercised in the modeling, so that when the castings are drawn the discouraging results usually obtained have been overcome and the effect obtained is that of handcut stonework. There will be no natural stone used on any part of the construction work, everything being of concrete and cement mortar.

VACCINE LABORATORY AND STABLE FOR NEW YORK CITY BOARD OF HEALTH, WESTCHESTER, N. Y. MESSRS. SNELLING & POTTER, ARCHITECTS, NEW YORK, N. Y.: FOUR PLATES.

THE UNION BUILDING AND THE SANTA FÉ FREIGHT DEPOT, LOS ANGELES, CAL. MR. HARRISON ALBRIGHT, ARCHITECT, LOS ANGELES, CAL.

CITIZENS' NATIONAL BANK BUILDING, LOS ANGELES, CAL. MR. HARRISON ALBRIGHT, ARCHITECT, LOS ANGELES, CAL.: TWO PLATES.

The footings, columns, girders, floors, walls, etc., are of reinforced-concrete. The floors of the lobby, banking-room and toilet rooms are mosaic tile. The floors of all corridors and offices are cement. The interior doors, trim, etc., is mahogany-finished birch. The walls and cellings throughout the building are tinted. Throughout the several stories the floor panels in this building have been subjected to excessive test loading under the supervision of the architect and the city building inspectors, and pronounced by them to be the strongest floors in the city.

HERBIVORA BUILDING IN THE ZOOLOGICAL GARDEN, CINCINNATI. MESSRS. ELZNER & ANDERSON, ARCHITECTS, CINCINNATI, O.

HOUSE OF MR. ALBERT KAHN, ARCHITECT, DETROIT, MICH.

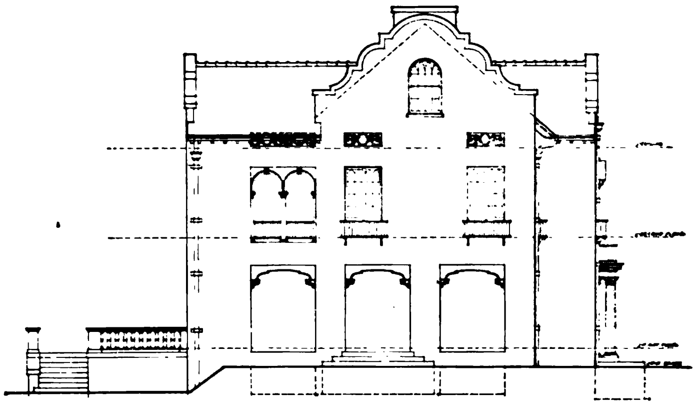
HOUSE OF ROBERT ANDERSON, ESQ., CINCINNATI, O. MESSRS ELZNER & ANDERSON, ARCHITECTS, CINCINNATI, O.: TWO PLATES.

THE U. S. GRANT HOTEL, SAN DIEGO, CAL. MR. HARRISON ALBRIGHT, ARCHITECT, LOS ANGELES, CAL.: TWO PLATES.

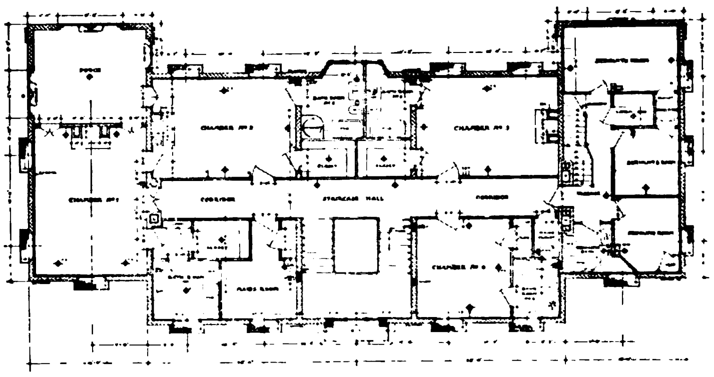
The footings, columns, girders, floors, walls, etc., are all constructed of reinforced-concrete. The exterior of the building will be faced with cream-colored glazed terra-cotta. The floors of the lobby, café, bar-room, toilet-rooms and bath-rooms will be of mosaic tile. The floors of billiard-rooms, ball-room and parlor will be of wood mosaic. Floors of all other rooms and corridors will be of cement with fastenings for carpets imbedded therein. The interior trim will be birch, finished a rich mahogany color. The walls of all rooms throughout entire building will be decorated.

HOUSE OF DANIEL BACON, ESQ., ARDSLEY-ON-THE-HUDSON, N. Y. MR. OSWALD C. HERING, ARCHITECT, NEW YORK, N. Y.

This house, 35 feet wide and 90 feet long, is built of reinforced-concrete from the footings to the gables, including the floors and



bearing walls, with partitions and furring of hollow terra-cotta blocks. The low attic, however, left unfinished for general storage, is roofed in the usual manner with wood rafters. The exterior walls will be finished with a selected pebble-dash. The roof tiles are of a yellow-brown, especially made to conform to the color scheme, and above the second-floor windows panels in relief, by a well-known sculptor, will be executed from the architect's drawings. These panels are to be made of cement colored in three tones. The rafter ends, window-casings, and all the exterior woodwork will be stained a gray-black, and the contrast of color against the background of warm gray concrete will be effective and pleasing.



The contract was awarded without competition to a builder experienced in concrete work and with a reputation for honesty and thoroughness. Such an unusual procedure is not surprising, however, as it has come to be recognized that unless this form of construction is carefully and honestly carried out, disappointment and possible disaster will ensue.

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FEW things are more interesting than the explanations that are given by those upon whom rests the responsibility of conducting to a safe conclusion the building of the Cathedral of St. John the Divine in justification and support of their expressed sense of satisfaction with the rate of progress and the achieved results. When Dr. Huntington, rector of Grace Church, at the annual meeting of the Church Auxiliary of the Cathedral, declares that the undertaking to build the Cathedral was "either an act of supreme folly or else of sublime faith," one does not feel like putting into words some other possible definition of the act, but when he declares that people "ought to be satisfied with what has been done in twenty years," because it took some six hundred years to perfect Cologne Cathedral, we feel bound to say that as an apologist and champion he is as mixed in his ideas as he is astray in his logic. Of the depth and reality of the religious and ecclesiastical need of a cathedral upon Bloomingdale Heights we cannot pretend to judge, but if there is such need we are convinced that it should be satisfied with a speed and perfection becoming to the twentieth century and not barely comparable to those which did so much honor to the thirteenth and fourteenth. Supposing that the thirteenth-century builders had had at command the building processes and equipment of to-day, and were within hand's grasp of the treasure-chests of the richest city in the world, it cannot be doubted but that they, with their conviction and glowing enthusiasm, would already have finished this building, great, elaborate and costly as it unquestionably is to be. Suppose, again, that the building were intended to bear upon its front the inscription, "The Carnegie Cathedral of St. John the Divine," can anyone believe that the building would be only one-sixth built at the end of nearly a score of years?

WE have felt at times that cathedral-building in these days was a little of an anachronism, and we have no hesitancy in declaring that it is unqualifiedly anachronistic to employ the pace only of the thirteenth century while neglecting the spirit. If those responsible for this undertaking are to be justified by their works, they must rouse themselves and discover that, while they were fancying they were shaven monks and their workmen sandalled serfs and vassals, unaided by steam or electricity, the great Westminster Cathedral in London had been builded and put to its intended uses. Although the New York cathedral is in a sense a private affair, it seems to us that, as all building-operations are to the public in the nature of an eyesore, the community has enough at stake in the matter to justify it in making strong recommendations that an effective change in the administrative end of the undertaking should be brought about. The fact that, while there are in this diocese some seventy-five thousand communicants, there have been thus far collected for the Cathedral in all these years a little short of thirty-one hundred thousand dollars, seems to prove that the recommendation suggested might be both judicious and timely.

IT is permissible to hold varying views as to the real architectural value of monolithic columns of unusual size, and many architects may not share our feeling that in most cases they are not worth half their cost. It will be remembered that, after much money and time had been spent in trying to get out monolithic granite shafts for the columns in the choir of the Cathedral of St. John the Divine, the architects had finally to accept shafts cut in two pieces, as block after block broke in the lathe while being turned to shape. Even then, in their smaller and more manageable form, the streets over which the heavy stones were dragged suffered considerable damage. But architects who believe in the value of these expensive and eccentric features should always keep in mind the possibility that their cherished desire may be thwarted and the costly monstrosity left on their hands simply because it is undeliverable by rail, and water-carriage is out of the question. A case in point is that of the red granite monolithic obelisk which, it is hoped, may finally be set up as a memorial at the entrance to the Sault Ste. Marie Canal in Michigan, but which at present lingers at the quarry in Branford, Conn., because the railroad-men have not yet discovered a route that affords curves of the proper radius and bridges and culverts of unquestionable stamina. And yet the stone is but forty-five feet long and weighs hardly more than sixty tons.

IT will be remembered that, a year ago, a curious and interesting discussion arose as to the sex of angels, growing out of the fact that Mr. Gutzon Borglum, in modelling certain angels for the Cathedral of St. John the Divine had given to each and every the graces of the female figure. The result of much learned discussion on the part of those instructed in theological, if not in artistic, lore, seems to be that, if angels have sex, the authorities indicate that such sex is in most cases, if not in all, masculine. As a consequence of this discovery, Mr. Borglum remodelled some of his figures, not waiting to submit the matter to legal determination. Similar action, however, has not been taken by Mr. Bernard Ellison, a painter, in a very similar case which turns on the question whether the canons of ecclesiastical art are fixed or variable, and if, being fixed, an artist ignorant of their existence can vary from them and yet collect his fee. It seems that Mr. Ellison was employed to do certain mural paintings in the Roman Catholic Church of St. Rosalie, in Brooklyn, in which the figures of the Saints were to be introduced, but when the work was unveiled the priest and congregation were amazed to find that the Saints had been painted as bearded instead of as smooth-shaven men. On the ground that only the Prophets and Fathers of the Church wore beards, Mr. Ellison was refused payment for his work, as he obviously had not satisfied his contract, which was to paint Saints. As the artist now sues to recover for his work only one hundred dollars, the reader can draw his own inference as to the magnitude and intrinsic value of his work, but the incident shows clearly that ecclesiastical art is not a thing to be undertaken by those ignorant of its iconography.

IT seems that the suggested seven-hundred-foot skyscraper to which we alluded recently is not to obliterate altogether Richardson's Court-house at Pittsburgh, since the tower, built on a base ninety feet square, is to rise, if built, from the court-yard of the present building. Should this structure actually be erected—and before work is begun on it owners of land in its neighborhood would do well to consider the very illuminating diagrams[1] prepared by Mr. William Atkinson while investigating the evil consequences of a somewhat similar building suggested for Boston—it would give an excellent chance for determining how tenable is our theory that skyscrapers are responsible largely for the alarming increase of the death-rate from pneumonia. The doctors just now are pointing out that there is now only a point's difference in the rate between consumption and pneumonia, and that the phenomenal increase in the latter case is synchronous with the advent of the extra-high buildings in our cities. We some time ago suggested that the skyscraper might be responsible for certain forms of lung disease, for though the healthy man can easily endure the slight difference in atmospheric pressure between the street and the top floor, the man with weak lungs or the aged may find this sudden change of pressure, slight as it is, the last straw that overloads his powers of resistance. A sudden lift of six-hundred feet in an atmosphere so heavy as is Pittsburgh's at the street level would surely show a measurable difference in pressure and indicate results that would be perceptible by the skilled observer.

[1]See "American Architect" for March 3, 1906.

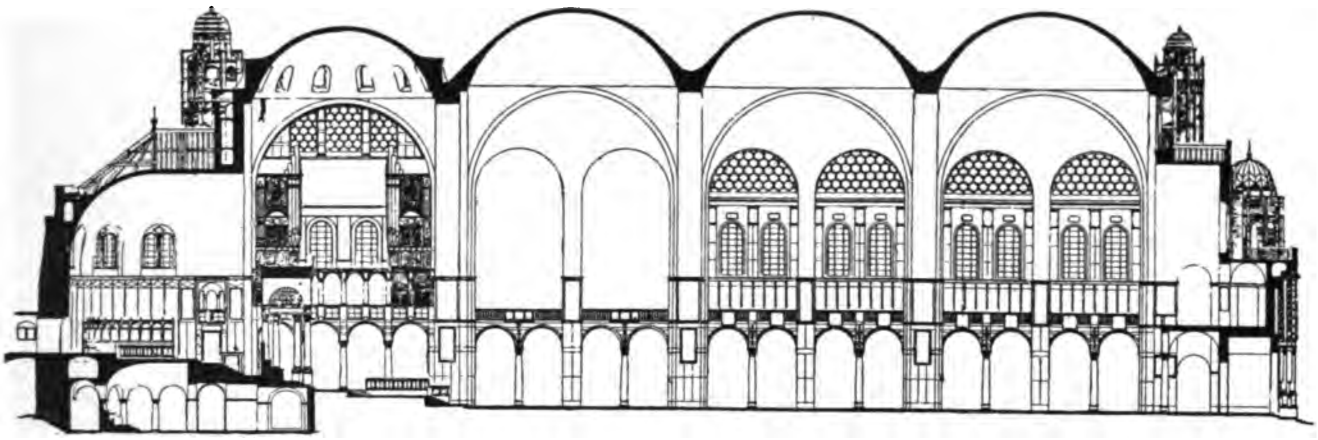
IT will be remembered that ex-Governor Pennypacker and his fellow-members of the Capitol Building Commission have, ever since the unsavory scandal over the Pennsylvania Capitol began to unfold itself, rather plumed themselves on the fact that their part of the work was well and honestly done, and that the Capitol fabric had been well built and finished at an outlay of something like six hundred thousand dollars less than the appropriation, four millions. But, alas! even this consolation seems likely to be denied them, and Payne, the contractor under them for building the Capitol, seems now likely to be found as deep in the mud as Sanderson, the "furnishing" contractor for the other Board, is deep in the mire. At recent sessions of the Investigating Committee, sub-contractor after sub-contractor testified, when confronted with public vouchers in the shape of receipted bills drawn upon their several billheads, that they had not rendered the accounts exhibited to them, but had actually presented much smaller bills. In each such case the sub-contractors remembered that Payne, on one plea or another, had obtained from them copies in blank of their standard billheads! Just what became of the differential is not stated, but the inference seems to be that the man who prepared these padded invoices kept it all.

ONE does not, for some reason, have very much respect for compromises, whether they affect verdicts or merely the settlement of a disputed account, and yet a large part of the progress all about us is the result of just such compromises. Just what value in a legal sense a compromise has, we are not learned enough to know, though we do understand that a matter "settled out of court" has not the standing as precedent that it would have had if finally reached as the result of court proceedings. Still there are compromises and compromises, and we apprehend that when a public body or municipality—which has abundant means and limitless time for litigation—has settled a suit out of court by compromising with the claimant, a precedent has been established of far more value than if the dispute had been between two private individuals. Therefore, we feel that Messrs. Rankin, Crane & Kellogg have done almost as good a turn to the profession in accepting from the City of Newark a payment out of court of some $2,000 as if they had collected in court their full claim, the $7,895.85 for which they sued for the breach of an implied contract between the Board of Education of that city and the several competitors who, relying on the advertised invitation, expended their time and skill in the preparation of designs for a Manual Training School. The lesson is a very wholesome one, for it is difficult to see how the city can avoid making similar compensation to the other disappointed competitors—provided that, like the Philadelphia architects, they have kept their office-accounts with the same business-like particularity and can produce the evidence needed to substantiate their itemized claims.

WESTMINSTER CATHEDRAL.[1]—I.

TWENTY-EIGHT years ago, in a house once occupied by Edmund Burke, who wrote an essay on "The Sublime and the Beautiful," a number of assistants were engaged in working out the designs of a well-known architect. These designs were for important buildings, in all styles, ranging from the Romanesque to the Renaissance, and they showed a power and a knowledge of detail unsurpassed, we believe, at that time. Before entering on his duties the assistant was told that he would not be expected to design, but merely to exercise care and judgment, and to take an interest in his work. From the time when he entered this realm of art in the morning until his departure in the evening he was virtually a prisoner, and the annual holiday was a reprehensible undertaking, rather than a recognized institution. Smoking, whistling and gossiping were strictly prohibited, and to take off one's coat for greater freedom or coolness was preeminently disrespectful, not to say vulgar.

But undue restraint—if such it was—engenders reaction, so whenever a suitable opportunity occurred—it may seem strange to you—conventionality was cast aside for uncontrollable outbursts of boyhood; the "Sublime and the Beautiful" were then forgotten, and not a thought was given to the occupant of the room below ours, until we received this charming admonition from our respected master:



Choir., St. Peter's Crypt. Baldachino and High Altar. Sanctuary. Transept. Nave. Narthex.

WESTMINSTER CATHEDRAL: LONGITUDINAL SECTION.

13 John Street, Adelphi, W. C.
April 3, 1879.

Gentlemen:—

Mr. G. writes, complaining of the unnecessary disturbance you indulge in, and requests me to ask you to refrain from making more noise than is essential to the performance of your duties. I feel sure, after this, neither of you will give cause for further complaint, inasmuch as it is unbecoming to engage in acts that affect the dignity of an office and the peace of a neighbor.

Yours faithfully,
JOHN F. BENTLEY.

And now, gentlemen, in the face of this somewhat humiliating confession, you will understand that we scarcely dared to presume to accept the invitation of your Council to read a paper on the Westminster Cathedral, and in view of what has already been written on this great work of Mr. Bentley's by men of "light and leading," we have also to confess to a feeling of surprise that the subject should be considered to possess some latent interest that has not yet been revealed.

Perhaps it was thought we might be able to explain the apparent incongruity or contradiction in this last phase of Mr. Bentley's artistic development, how—like Athene from the brain of Zeus—this strange design, of noble proportions, could be produced in so sudden and complete a manner by one of the latest exponents of the Gothic revival. Or was it expected that some light could be thrown on Mr. Bentley's intentions respecting the completion of a building that may be said to rank with those of national importance?

As the effacement of man's work—by the hand of time—increases our curiosity to look into the past, so does the unfinished production impel us, with equal and perhaps pardonable curiosity, to look into the future; not merely to speculate as to what might have been had the master lived to finish his work, but to wonder what may happen in the absence of his guiding influence.

You remember that touching incident related by Vasari, how the pupils of the immortal Raphael placed at the head of the bed on which their dead master lay his unfinished picture of the Transfiguration, while they stood around like helpless orphans. You will, I am sure, agree that that picture should have been allowed to remain just as it left the master's hand, without the profaning touch of any pupil.

The simile need not detain us, yet we cannot forget that an unfinished building, in occupation, is not quite the same thing as an unfinished picture or piece of sculpture; existing contracts have to be carried out, and the varied requirements of the occupants have in some way to be met, yet we all fully realize that the peculiar impress of the work carried out under the personal supervision of the original architect can never be revived, nor can it, in this instance, be emulated.

Reverting for a moment to the supposed inconsistency of style, it is not necessary to remind the members of this association that the training of an architect is now very different from what is was ages ago, when the builders of each country worked in only one traditional style that could easily be adapted to the simple requirements of the community. Then, the young architect—we are told—learnt the principles of his art, profession, or craft, on the building, in the workshop, and at the guild. His whole environment was redolent of lime, timber, stone; he was not afraid of soiling his gloves, nor of crushing his silk hat against the scaffolding; paper and rubber were not part of his outfit, and drawing, as we understand it, not one of his qualifications.

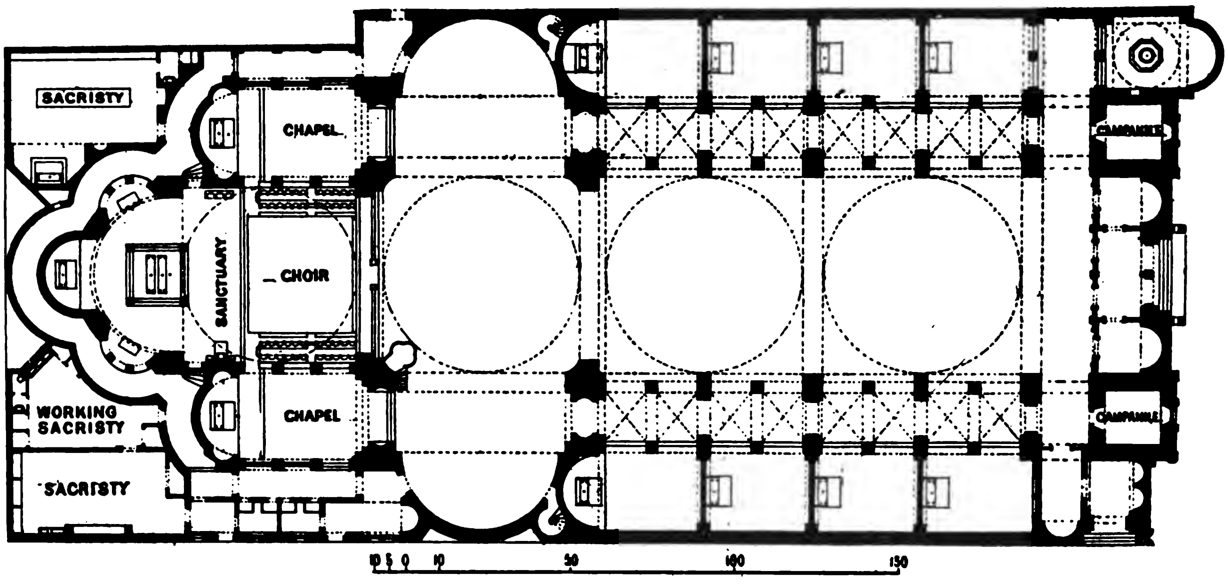
If one of these obscure cathedral builders could enter this room to-night we would ask him to tell us more about this, and in return initiate him into the mysteries of modern practice; he would then realize that the times had, indeed, changed; that vast storehouses of knowledge were open to us that were quite unknown to him; that the demands on the skill of our architects are so bewilderingly varied and complex as to prevent the universal application of any particular style, old or new; and that the life-work of a modern architect has not infrequently presented an epitome of the styles of all ages.

He would learn that we spend most of our time in "the office," and some of it on the building. And, lastly, the perspicuity of our building-regulations and the simplicity of our sanitary requirements would equally astonish him, were it at all possible for us to explain them.

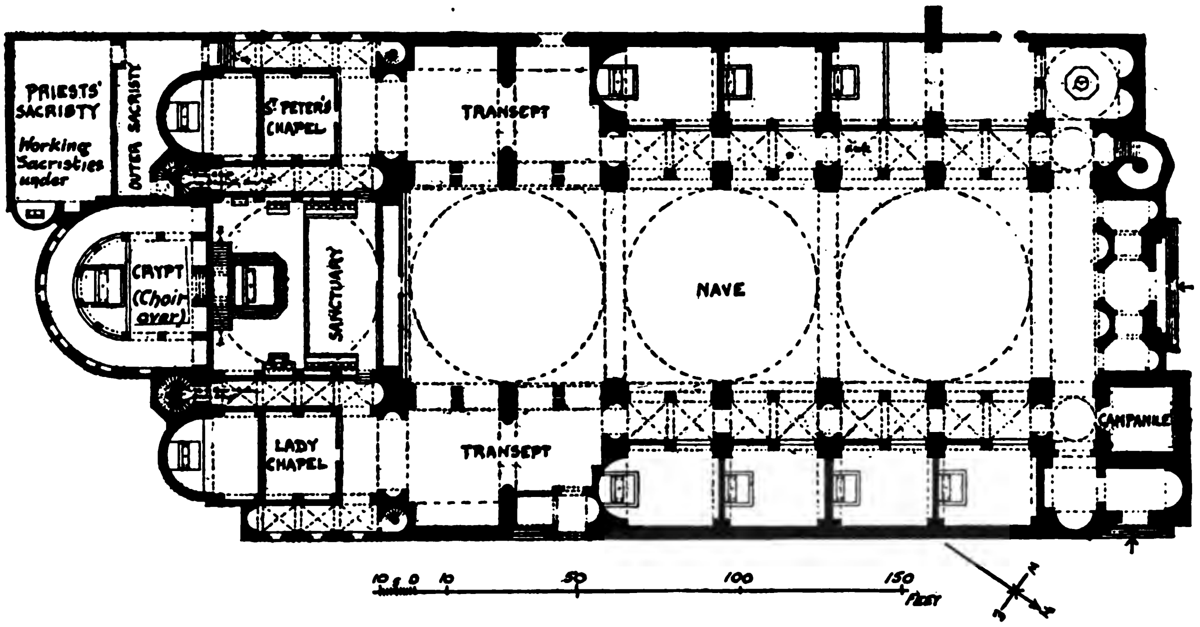
If our visitor happened to be an English, or, say, French architect of the mediæval period he would, of course, not quite understand the style of the Westminster Cathedral. He might possibly detect in the plan the Christian symbol of the Cross, and he would recognize as old friends the gaunt Norman-looking transepts and the well-buttressed choir; the sheer unbroken height of the campanile might win his admiration, but the inconsistent treatment of the roofing and the peculiarities of the west front would certainly puzzle him and provoke the question as to whether these were the outcome of necessity or of design.

If the exterior betrayed to his mind some slight acquaintance with the work of his own period, the interior would bear no such trace; for a moment the unconcealed austerity of its structure might remind him of some early abbey or conventual church, but he would soon find that the resemblance was more visionary than real, and that, after all, it was not a Gothic building that had served as the prototype.

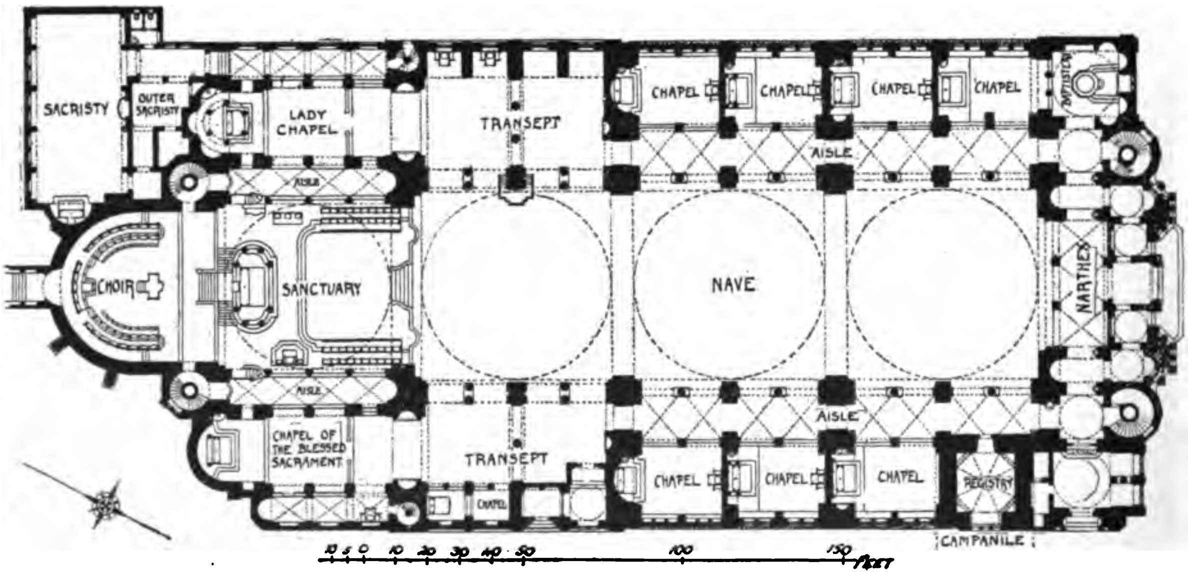
[1]A paper by Mr. J. A. Marshall, read before the Architectural Association, April 12, 1907.



The First Plan.



The Intermediate Pla



The Final Plan.

THE DEVELOPMENT OF THE PLAN OF WESTMINSTER CATHEDRAL. JOHN F. BENTLEY, ARCHITECT.

He would rightly infer that it was not intended to hew the brickwork into clustered shafts and mouldings, and until he detected the proposed scheme of marble and mosaic decoration, his only conclusion would be that it was intended to plaster the whole surface with a view to mural decoration—or whitewash.

But let us assume that our visitor is one of those Greek architects who, we are told, crossed the Adriatic to build St. Mark's, Venice. On approaching the western façade he would be disappointed not to find a spacious and well-lighted outer narthex, forming an ambulatory or vestibule comprising all the main entrances, but this feeling of disappointment would soon give way to one of satisfaction when he entered the nave and realized the striking influence of his own work, after ten centuries of time. The main structural ideas, necessitated by the statical requirements, would be familiar, and so would the proposed method or scheme of applied decoration.

He would note, however, with regret that the cruciform or symbol on the plan appeared to be tolerated rather than emphasized, and we should hasten to explain that, though the architect's starting-point was the Cross, his ultimate idea was an unbroken nave, or hall, some twenty feet wider than St. Mark's, and that the transepts should not be regarded as part of this space, but rather as extension of the eastern chapels.

"I see that is so," he would respond, "but in our basilica at Venice we made the transepts as important as the nave, and covered them with domes in the same way, and I cannot help feeling that this arrangement—apart from any religious sentiment—is a more perfect ideal, and gives additional charm or variety to the interior."

"Possibly," we should cautiously observe, "and it may interest you, sir, to know that your church at Venice has been so much admired—since your retirement—that its predominant idea has been copied elsewhere almost line for line. And it may still further surprise you to learn that the architect's first conception for the Westminster Cathedral was a bold attempt to realize these very qualities that appeal to you so strongly."

Regarded as the tentative scheme of a great architect for so important a work, the first sketch plan, made twelve years ago, is interesting, though it doubtless lacks the homogeneity and the statical completeness of the final plan. And should our friend be curious to know why this first conception was abandoned, we should have to explain that the more the architect considered the matter the less satisfied he felt with the transeptal arrangements and the "crossing"; the abutment for these parts, in the east, was insufficient, and the complications connected with the exterior were not encouraging; then it was decided that the eastern termination of the church should not be used as a sanctuary, but as a choir; it was also decided to limit the sacristies to one side of the building, and to rely on the aspiration of a single campanile rather than on the conflicting efforts of two. In the revised plan the sanctuary and the choir have changed places, aisles have been introduced between the sanctuary and the eastern chapels, thus improving the abutment, but necessitating the abandonment of the apsidal terminations of the transepts, in order to provide suitable approaches to the eastern chapels. The transepts having now lost their peculiar form, we find the architect resorting for internal effect to another ideal, which, in the course of his practice, had become so indelibly stamped on his artistic temperament that it invariably appeared in the churches designed by him. We refer to the unbroken continuity of the nave arcades and vaulting across the transept openings, without entirely sacrificing the cruciform plan. This unbroken rhythm, or repetition of parts, produces an impression of length and height—a vista, if you will—that was most attractive to the English architect. And we should ask our visitor whether a similar effect was not produced by filling in the side arches of the great prototype at Constantinople. "Quite so," he would reply, "but in that case the artistic effect of the expedient was not the primary object, and the buoyancy of the culminating dome has scarcely been impaired. Permit me, further, to say that I think I now realize what I may term the vital difference between your cathedral and our great churches of the East. At Constantinople and at Venice the supports are concentrated, or limited to a few positions, whereas at Westminster, in addition to the main supports, auxiliary piers and arches are introduced that give a distinctive character to the design, suggestive, if I may say so, of a commingling of our Eastern with your Western methods; it is only in the sanctuary of your cathedral that I can detect the structural lines of the Greek type reproduced in their integrity."

Again, it would be still more interesting to some of us to know the views of yet another architect, of a period still more remote—one of those builders of Imperial Rome whose colossal works are still the wonder and admiration of the world. We should prefer to conduct this gentlemen, blindfold, into the cathedral, and suddenly reveal to him the vast expanse of its interior; then, if he did not think that he was in the tepidarium of a large bathing-establishment, we should say that he had never seen one. The length of the nave agrees with that of the central hall of the Thermæ of Diocletian, but the width, instead of being merely sixty feet, as it is, should be increased to eighty feet; then, if the secondary piers and arches are obliterated—thus reducing the supports to eight in number—and the pendentive system of vaulting changed into the groin-vaulting of the Romans, the illusion will be well-nigh complete.

On leaving the building our Roman visitor would be startled, not only by the determined aspiration of the campanile, but by the ornate qualities of the exterior generally; he would miss the sturdy vigor of his own work, and his limited acquaintance with architectural styles would not enable him to detect the strong influence that Byzantine, Romanesque and Renaissance detail have had on the design.

Having now, by retrogression, drifted to the source of the Renaissance, there is an obvious temptation to overleap the intervening ages at a bound, and so reach that "harbor of refuge," that "sheet anchor" of the modern practitioner. We do not, however, propose to invoke the shade of any past, nor the person of any living votary of that accommodating and fashionable style; and cordially as we should welcome the apparition of the greatest architect of the English Renaissance, we appreciate the delicacy of the situation, and proceed without further delay to take a closer view of our subject.

You will have gathered that the dominating factor of the problem worked out by the architect has been a spacious and uninterrupted nave, covered with domical vaulting, and it will be obvious to you that the exceptional width of the space to be covered called for exceptional height, if due proportion of the interior was to be maintained.

Thus the difficulties of support and abutment were soon realized, and in selecting the pendentive dome of shallow concavity for the roofing, the architect believed that the weight and the pressure would be reduced to a minimum. By showing the domes outside, not only was an extraneous roof dispensed with, but full advantage of the height was gained for the interior.

In the disposition of the piers and abutments, with a view not only to the sustentation of the pressure, but to reserving as much space as possible for the aisles, chapels and galleries, a system has been adopted not unlike that to be seen in most Gothic cathedrals, where huge, yet narrow, counterforts are projected at intervals, and stiffened by transverse walls, arcading and vaulting. But while in a Gothic cathedral these counterforts are generally most conspicuous features outside the building, at the Westminster Cathedral they are practically limited to the interior, the spaces being entirely utilized. It may be noted, in passing, that in the latest instance of cathedral design in this country both these methods have been rejected in favor of one in which all buttresses, as such, are avoided by deeply recessing the alternate bays as transepts; and should this arrangement involve a sacrifice of that uninterrupted succession of parts that Mr. Bentley so much admired, it will be admitted that this is not the only quality that can be legitimately aimed at, and it is probable that the result at Liverpool may disclose quite opposite qualities that will fully compensate for the loss referred to; at present we can only wish every success to the young architect who is now engaged on this important work.

Confining our attention for a time to the nave of the cathedral, let us more carefully examine the counterforts and the vaulting they sustain. A reference to the plans will show you that only in one instance is a main counterfort permitted to retain what may be termed its simple, unaffected character, all the others being more or less influenced or modified by the exigencies of the plan; thus two of them form the flank walls of the transepts, where, on the east, they are further strengthened by the walls and vaulting of the sanctuary so as to resist the cumulative pressure of the nave vaulting. At the west end of the nave the corresponding abutment has been very considerably affected, not to say weakened, in the upper part by the retiring disposition of the western façade, a concession to light-and-air claimants.

Of the secondary counterforts, those dividing the transepts have also a distinct and complicated character, while the others

retain their simple form—excepting that next the campanile, but this of course affects only one side of the building.

The proportions of each compartment of the nave are those of a cube, up to the springing of the main arches 60 feet from the floor. Another 30 feet 4 inches and we are at the springing of the domes; the total internal height being 111 feet, or about 10 feet higher than the choir of Westminster Abbey.

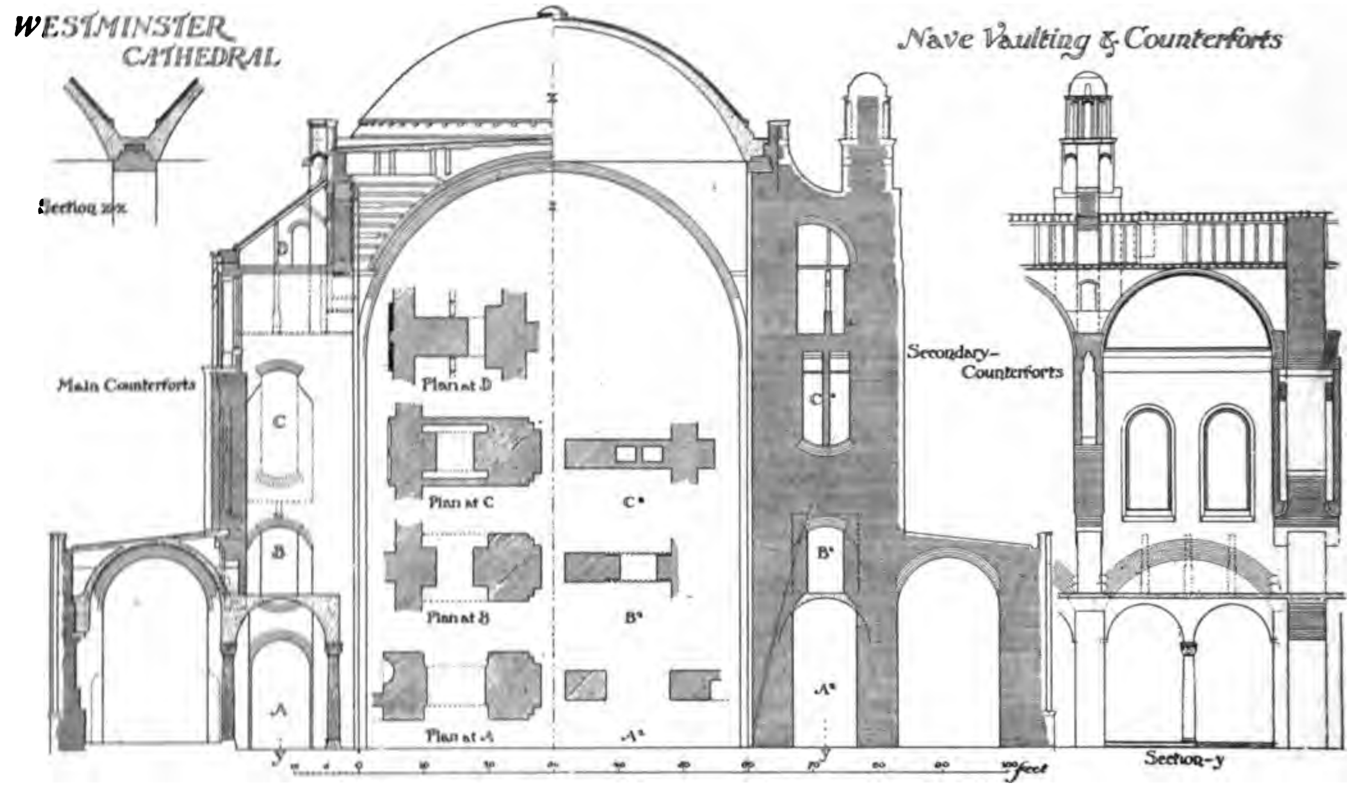
The extreme projection of the counterforts is 48 feet, but just above the chapel vaulting this projection is suddenly reduced to 24 feet, at which it is maintained to a height of nearly 90 feet. The lower projections—forming the divisions between the chapels—are but little more than flying-buttresses, filled in with thin walls, so as to form recesses for the altars.

The enclosing walls, with the brick vaulting over the galleries and transepts, serve of course to stiffen the counterforts and to increase the abutment; but the lower concrete vaulting of the aisles and chapels is not so important in this respect, and its construction was deferred until the main parts of the building were finished and the full pressure of the superstructure had been realized.

And here the suggestion can scarcely be evaded that this part

You will now see that the chapel arcades and vaulting are relieved of all extraneous weight, and it has been possible to make the arcades very slender, thus gaining extra space for the chapels, and imparting to these minor parts of the building a suitable relative proportion or scale. You will also now realize the importance of the galleries, in disguising or masking the apparent weakness of the construction behind—just as a balcony is often projected along a façade as an antidote against the weak appearance of a ground-floor story.

The archways formed in the lower part of the counterforts to preserve the continuity of the aisles, galleries and passages have been kept as small as possible, but in the upper parts hollow spaces have been left to economize material. These spaces were not enclosed until the brickwork had been exposed some time to dry, and small openings for ventilation were left in the upper and lower parts of the cavities to facilitate the drying after the enclosing walls were built. It was also desirable to keep these walls down until the cavities were arched or corbelled over—as the case might be—to prevent the accumulation of rubbish that would have blocked up the ventilators at the bottom.



of the design does not so exactly express the construction as do some of the other parts; for the massive walls of the triforium are not as might be supposed—supported on the arcades that divide the chapels from the aisles, but on segmental relieving-arches, turned over these arcades between the counterforts and concealed in the pockets of the vaulting. The span of each relieving arch is twenty-five feet, and the skewbacks are not cut into the piers, but are formed on granite springers that project beyond.

This expedient to reduce the span and maintain the piers intact was most essential next the transepts, where the triforium wall suddenly stops, and the abutment has been weakened by the formation of a passage in the wall of the transept. In view of this, and the complicated section of the relieving-arches—due to the difficulty of clearing the vaulting of the chapels—you may perhaps wonder why so favorable an opportunity for the use of steel girders that involve no thrust and occupy but little space should have been neglected; but the architect resolved not to introduce into the cathedral any ironwork as a support, though, as we shall see, he did not feel justified in objecting to its use as a tie.

The projections or buttresses between the lower windows of the triforium or gallery have an artistic value, though they serve no structural purpose. They are apparently supported on the flat roofing of the chapels, but they are really dependent on stone corbels that rest on the relieving-arches and blush unseen.

The main counterforts are 10 feet 6 inches wide, and from these, at a height of 60 feet from the floor, spring the large transverse arches 6 feet 9 inches wide that support the pendentives and the domes. As the thrust exerted by these arches and the pendentives is at a level much below the springing of the domes, it was not considered necessary to raise the main counterforts higher than the lean-to roof of the passage over the triforium vaulting; but the secondary counterforts, placed opposite the centers of the domes, are raised well above these roofs and weighted with turrets, the supporting arches and wall at this level being comparatively thin.

We have already referred to the exceptional character of the counterforts dividing the transepts. These, you will notice, consist on the ground plan of two piers, one next the nave, the other next the outer wall, the space between being arched over, just above the level of the gangways or galleries that cross the transepts. To dispel the weak appearance of the pier next the nave, and to ensure a uniformity of scale on the ground floor, the openings between the piers are filled in with arcades that agree in height with those of the galleries; but these arcades do nothing towards counteracting the thrust of the arches over, and, indeed, they were not inserted until long after the main parts of the structure were built. In building the pier next the nave the precaution had been taken to make it nine inches wider than the corresponding piers of the nave, but this was not considered sufficient, so a rolled steel tie was inserted just below the spring-

ing of the arches, where it would be eventually concealed by the arcades; and at a higher level, just above the crown of the arches, another similar tie was built in. When it is considered that the turrets of these transept counterforts are directly over the arches, and that the arches sustain nearly half the weight of the vaulting and the roofing, and that one of the domes is partly dependent on the pier, it will be admitted that these precautions are not altogether uncalled for.

At the west end of the nave the bewildering ramifications on the ground floor promise well for the abutment at higher stages of the work; but as we ascend the gradual recession of the western façade soon dispels the illusion, until, on the top stage, where the pendentives exert most pressure, we find that counter resistance has been reduced to a minimum. Another effect, due to these legal restrictions, appears inside the building, where the perimeter of the western dome seems to be too near the large west window—a deep barrel-vault over the window, as originally intended by the architect, would have afforded better resistance and greatly improved the interior.

Having now considered the main features of the nave, regarding support and abutment, we will go back in imagination to that stage of the work when the main supporting arches had been turned, and the centering for these was still in position, there to remain until the final weight had been imposed.

On the north and south sides these main arches were not turned until the lower secondary arches and the brick filling over were finished, so that the brickwork served as centering for that portion of the main arch that passes through the wall; but for the projecting portion, on which the pendentives rest, it was, of course, necessary to provide thin centering of wood. At the springing level of all the arches and brick barrel-vaulting, rough stone corbels were built in to support the centering, the projections being afterwards worked off. The spandrels of the main arches are filled in up to the crown level with brickwork, set back 13½ inches from the faces of the arch, to reserve a seating for the concrete of the pendentives. The visible junction of the brick arch and the concrete forms merely an angle or line, and if we follow these lines down to the springing where the supporting arches separate we shall find them meet, so that the surface of the pendentive expands or develops from a mere point, but this apparent weakness in the construction is obviated by the very common method of building the lower portion of the arches and the pendentives of brick, in horizontal courses; thus a continuous joint is avoided by cutting the brickwork to the required angle, and the top of the brick corbelling forms a seating of considerable area for the solid concrete backing.

The lower portion of the pendentive, just described, rises to a height of 13 feet above the springing; fixed centering for this part was not necessary—the accuracy of the demispherical curves being ensured by the application of movable templets. But, for the upper part of the pendentive, closely-boarded centering was necessary and to support this at the bottom a projecting stone landing was built in on the top of the brick corbelling, the projection being afterwards worked off. To secure bond for the concrete backing of this upper part, and to distribute the bearing, six-inch stone landings are built in at intervals, in the height across the angles formed by the enclosing spandrel walls.

Projecting courses of brick are also formed on these walls to serve as a key for the concrete. To limit the weight, the top part of the pendentive has no solid backing; it is, in fact, built as part of a dome, having a shell two feet six inches in thickness, but on this shell radiating counterforts or ribs are formed that incline up to the base of the dome, and on these counterforts there are light sleeper walls that support the flat roofing around.

To ventilate the cavities 4½-inch drain-pipes were inserted in the shell, and counterforts communicating with the interior of the building. Constructionally, the pendentives may be regarded as corbels, by which the weight of the domes is not merely sustained, but directed to the piers.

(To be continued.)

ROMANCE AND ST. MARY-LE-BOW.[1]

ST. MARY-LE-BOW Church is one of ancient foundation, although the present building only dates from 1671. John Stow, as is usual with him, tells us much about the earlier church. He died some sixty years before the Great Fire of London, so that we have the advantage of learning from his "Survey of London" many things about the churches which the fire destroyed. One important matter, however, we always miss in his writings. We are not able to picture from their perusal the architectural character and the ornamental Gothic details which abounded. We can only judge from the examples which are left to us that ecclesiastical London in a structural sense was a city of infinite architectural beauty. Stow tells us that "St. Mary Bow, in the reign of William Conqueror, being the first in this city built on arches of stone, was therefore called New Mary Church, or St. Mary de Arcubus, or Le Bow, in West Cheaping." He instances a similar example of the use of the word "Bow" in Stratford bridge, which was built by Henry I.'s queen, Matilda, with arches of stone, and was thus called Stratford-le-Bow. The antiquity of the Court of Arches may be judged from the fact that John Stow mentions it; he says that the Court "is kept in this church, and taketh name of the place, not the place of the Court; but of what antiquity or continuation that Court hath there continued I cannot learn." The older church had its vicissitudes. In the year 1090 the roof was blown over by the wind, and several persons were killed; four of the rafters, in length 26 feet, "with such violence were pitched in the ground of the High Street, that scantly 4 feet of them remained above ground, which were fain to be cut even with the ground, because they could not be plucked out, for the city of London was not then paved, and a marish ground." Then again, in 1196, a certain person of seditious tendencies, possessing an aristocratic name, William Fitz Osbert, seized upon Bow steeple, and fortified it with munitions and victuals. But his triumphant defence was short-lived; fire and smoke were brought to the aid of the attacking forces and bloodshed ensued, and his inglorious career was ended by hanging at Smithfield Elms, whither he was dragged by the heels.

Again in 1271 disaster occurred to Bow Church, when a great part of the steeple collapsed, killing many men and women. In 1284 one Laurence Ducket, a goldsmith, came into collision with one Ralph Crepin in West Cheap, and having grievously wounded him, fled into Bow Church. Ralph Crepin's friends entered the church at night and killed Ducket by hanging, after which they hung him up in such a manner as to suggest suicide; in fact, this view of the matter was taken at the inquisition (or inquest, as we should call it now), and Ducket's body was dragged by the feet to a ditch without the city for burial there. But the truth of the matter afterwards came out, and Jordan Goodcheape, Ralph Crepin, Gilbert Clarke and Geoffrey Clarke were attainted, a certain woman named Alice, the chief cause of the mischief, was burnt, and sixteen men were drawn and hanged, besides others that, after long imprisonment, were "hanged by the purse." The body of Ducket was taken up and buried in the churchyard, and the building itself was interdicted, the windows and doors being stopped up with thorns. We have said that the steeple fell in 1271, and it appears from Stow's record that the rebuilding was only partial at first, and was gradually added to until at length, in 1469, it was ordained by Common Council that the Bow bell should be nightly rung at nine of the clock. Then John Donner, mercer, by his will of 1472, left two tenements in Hosier Lane for the maintenance of Bow bell. The couplet relative to the late ringing of Bow bell has often been quoted; here is what John Stow says regarding it: "This bell being usually rung somewhat late, as seemed to the young men 'prentices and other in Cheap, they made and set up a rhyme against the clerk, as followeth:

> Clarke of the Bow bell with the yellow locks,
> For thy late ringing thy head shall have knocks.

Whereunto the clerk replying, wrote:

> Children of Cheape, hold you all still,
> For you shall have the Bow bell rung at your will.

A stone building called a "seldam," or shed, was erected by King Edward III. on the north side of the church facing Cheapside, then known as West Cheap. The object of this structure was to enable the king and his court to witness the jousts and processions which were frequently held in those days. It was probably not without reference to that fact that the present external gallery in the tower facing Cheapside was constructed.

The tower of the earlier church was surmounted by four pinnacles from which flying-buttresses supported a central pinnacle. This probably suggested the idea to Wren, which led to his adopting a similar plan in the construction of the tower and spire of St. Dunstan-in-the-East.

The church was the first to be rebuilt after the Great Fire, although repairs to St. Sepulchre and St. Christopher, Thread-

[1]Extracts from a paper read at a meeting of the Upper Norwood Athenæum by Mr. T. Pitt, F.C.S.

needle Street, were commenced in the previous year, 1670; in these cases rebuilding was not necessary. Four other churches in the immediate neighborhood of St. Mary-le-Bow have disappeared, and the parishes are now united; they are Allhallows, Honey Lane; Allhallows, Bread Street; St. John Evangelist, and St. Pancras, Soper Lane. The association of John Milton with Allhallows, Bread Street, is recorded on a tablet placed on the house which occupies the site of that church, with a medallion having the poet's head in relief. Another tablet, which was placed on Allhallows Church early in the nineteenth century, was removed in 1876, when that church was destroyed, and placed on the west wall of St. Mary-le-Bow. It records the poet's birth in Bread Street on Friday, December 9, 1608, and his baptism in Allhallows, Bread Street, in the same month.

The present tower of St. Mary-le-Bow consists, first, of a plain square tower 32 feet 6 inches wide by 83 feet in height, above which are four stories averaging 38 feet each; the first, a square belfry, adorned with Ionic pilasters, is 39 feet; the next, which includes the beautiful circular peristyle of twelve Corinthian columns, is 37 feet; the third comprehends the small lantern, and is 38 feet high, which is also the height of the spire, the whole making a height of 235 feet [Fergusson]. The spire is surmounted by the famous dragon, of which it was predicted that "when the dragon on Bow Church kisses the cock behind the Exchange great changes will take place in England." This actually happened in 1832, when the two figures were down and cheek by jowl in the repairer's yard. Then came the Reform Bill.

ILLUSTRATIONS

DORMITORY BUILDING FOR VASSAR COLLEGE, POUGHKEEPSIE, N. Y. MESSRS. PILCHER & TACHAU, ARCHITECTS, NEW YORK, N. Y.: FIVE PLATES.

CHATTANOOGA STATION, CHATTANOOGA, TENN. MR. DONN BARBER, ARCHITECT, NEW YORK, N. Y.: THREE PLATES.

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NOTES AND CLIPPINGS

THE HOTEL DARLINGTON DISASTER, ONCE MORE.—An echo of the Hotel Darlington disaster of three years ago was heard in the Supreme Court last week, when a jury in Justice Guy's part of the court awarded Emil Haenschen, as administrator of his deceased son, $15,000 for the boy's death against the Roebling Construction Company, the Allison Realty Company, and Pole & Schwandtner. The Hotel Darlington, while in course of construction, collapsed, killing twenty-five persons and injuring thirty. Emil Haenschen's son was a plumber nineteen years old.—*Exchange.*

YATE.—Recent tests of the hardwoods of Western Australia have revealed the extraordinary properties of yate, believed to be the strongest of all known woods. Its average tensile strength is 24,000 pounds to the square inch, equalling that of cast-iron. Many specimens are much stronger, and one was tested up to 17½ tons to the square inch, which is equal to the tensile strength of wrought-iron. The sawn timber of yate is probably the strongest in the world. The tree grows to a maximum height of 100 feet, and has sometimes a diameter of 2½ or even 3 feet.—*N. Y. Tribune.*

A PEATY SUBSOIL DANGEROUS.—The risk of a peaty subsoil has been displayed in the Wolverhampton workhouse. There where the boiler-house was placed there was a settlement through which one of the boilers was affected. A bed of concrete had been placed beneath the premises but it also sank. After an excavation to a depth of 7 feet 6 inches the cause of the damage was ascertained. There was a peat stratum which originally was 2 feet 6 inches thick, but apparently it became ignited through the heat of the boilers, and in consequence the depth was diminished one-third. Additional concrete will have to be used, and the outlay on re-setting the boilers is estimated at £600. In similar cases where the peat is only a couple of feet thick it would be better to remove it before the concrete is put in. Some of the floors of the work-house are attacked by dry-rot, which is supposed to arise from the obstruction of the openings for ventilation by rubbish.—*The Architect.*

WESTMINSTER PALACE FRESCOES.—The news that the House of Lords Committee is once more to inspect the ruined frescoes of the Palace of Westminster, which are for the purpose to be disinterred from beneath the wallpaper long since drawn over them as a means of decently burying the remains of what had been the young hope of a nation's enthusiasm, once more draws attention to this highly important question of mural paintings in London. These frescoes were themselves the result of a commission, and the fact that this body so poorly understood the atmosphere of their own city that they sanctioned a series of works which, though admirable themselves, could not last for half a century, may perhaps suggest a modest estimate as to the probable outcome of the present inquiry. It seems, however, to be forgotten that the Prince Consort's passion for fresco, which was mainly responsible for the ruined frescoes in the Lords, also originated another set in the summer house of Buckingham Palace. Men like Landseer, Eastlake, Leslie, Maclise, Dyce and Stanfield worked at these panels, and so long since as 1846 they were published with a preface by Mrs. Jameson. Nothing is heard nowadays of either frescoes or illustration, though the question naturally arises at a juncture like the present as to whether they have fared any better than those in the House of Lords. Can any of our readers throw light on the subject?—*London Globe.*

BRIDGE OF REINFORCED CONCRETE.—In strong comparison with the endurance qualities of other building material are those of reinforced concrete. It is in no sense subject to decay, and when it is used in sea water for the foundation of a pier or wharf it is unaffected by the teredo, which so quickly destroys timber. It is not affected by rust nor by the carbonic acid in the atmosphere. When properly constructed it requires no maintenance charge for painting or for any other kind of protective treatment. The various tests which have been made by the building bureaus of great cities, as well as by the involuntary test of great conflagrations, have shown that its power for resisting fire—and even a combination of fire and water—is greater than that of any other known type of building construction. The purposes to which reinforced concrete are now put are almost innumerable. The illustration shows a bridge of this material at Playa Del Rey, near Los Angeles. The extreme length of this structure is 205 feet 8 inches. Its span is 146 feet, which is 15 feet longer than any other cement bridge span in the world. The width is 19 feet, the spring 18 feet and the height above water 20 feet.—*Philadelphia Ledger.*

THE SIPHON UNDER THE HUDSON AT STORM KING.—In fifteen years New York City will be drawing its water from the great Ashokan reservoir, in the heart of the Catskills. The water will be brought to the city by a huge concrete and steel aqueduct, 100 miles long, and the largest in the world. The most striking feature of this aqueduct will be the stupendous siphon under the Hudson at Storm King. This is a feat of tunneling that puts to blush all the tunnels around New York City. The subways under the Hudson now constructing go down about ninety feet below the water; but the Storm King siphon will be sunk 650 feet below the surface of the water and 1,100 feet below the aqueduct gradient. If this were built on the air-pressure principle, used in the East River tunnels, all the workmen would perish from the pressure as soon as the work had gone a little below 100 feet under the water. As the engineers found it would be necessary to go below the fatal limit at Storm King, they decided to build a tunnel or siphon so far down below the river bottom that it would be in solid rock and not allow water to leak in. Going down over 600 feet, they calculate that little or no water will come in, and therefore they will not have to do the work or dig under pressure from compressed air.—*C. H. Cochrane, in the Broadway Magazine.*

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SOCIETIES, PERSONAL MENTION, ETC.

THE recent report of the Railroad Commission of the State of New York, containing, as it does, proof that in the first three months of this year there were broken on the railroads in the State nearly four times as many rails as were broken during the corresponding months of the preceding year, draws attention to a fact that is seriously disquieting to those who travel. In an inferior degree the phenomenon is of some special interest to architects, who, after the railroads, are the greatest consumers of rolled steel; not that there is any close relation between the stresses to which rails are ordinarily subjected and the strains which the steel frames of buildings naturally have to undergo. But if this strange and sudden increase in the failure of rails is due to changes recently introduced at the rolling-mills into the methods of melting and rolling, if there has been any change in the ores or in the proportions of the formulas used in smelting, it would seem to follow that, as structural shapes are produced after the identical methods used in rail-making, the material recently delivered and used for building has not just the qualities that users, guided by experience and the statements of text-books, suppose that it has. The danger is probably a remote one, and its cause is at any rate unidentified as yet; but architects will do well to follow the investigations into the cause of these accidents that railroad managers are now making. One point at least is worthy of attention: One of the large railroad systems has already placed its orders for new rails conditioned on the steel being puddled by the open-hearth process and no longer by the Bessemer process, as recently.

IF there is any one thing that has been established by proof that cannot be gainsaid it is that the factory mutuals have succeeded in constraining their clientèle to adopt methods of building and protection that have resulted in making factory buildings very safe insurance risks. It might be argued that, if the regular fire-insurance companies adopted the methods which the factory mutuals have devised and tested, a great gain for themselves could be effected at the same time with a larger benefit to the community. Unfortunately, this is true only in a very small degree and the progress toward a saner method of building can be brought about, through the insurance companies, only in very irregular and variable ways and degrees. But the value to the community of fire insurance, even in the wasteful way in which it is managed at present, is so real, so vast, that it is nightmarish to picture to oneself the condition of the business community if all the fire-insurance companies should liquidate and go out of business. The facts placed before the recent annual meeting of the National Board of Fire Underwriters seem to indicate that these very useful factors in modern business life have a very justifiable ground for turning to the community and demanding relief, relief real and instant, from the conflagration hazard. The demand would be a righteous one, since the conflagration hazard can exist only by and through the sufferance of the community at large.

THE report in question, presented by President Burchell, shows that the loss through the San Francisco fire to the 243 companies affected swept away, by more than $79,708,174, all the profits made by these companies since 1860, the year when the association was organized. To make good the difference here indicated a large draft had to be made on capital funds in many cases: in others heavy stock assessments had to be levied, while in others again the companies had to assign and the loss fell on the insured. It seems to us that a civilized community should be able to see the unfairness and unwisdom of expecting any portion of its membership to assume the duty of protecting it at such unfair risk to the undertakers, and it seems that it should be equally patent that the duty of protecting a community from the conflagration hazard rests not upon the underwriters, but upon the community itself. The one form of municipal ownership in which we most staunchly believe is the public ownership of effective fire-breaks.

AT a hearing of the new Building Code Commission in New York, last week, the representatives of the New York Board of Fire Underwriters pointed out that

a conflagration in the business district of New York that should sweep an area equal to that devastated by the Baltimore fire would, happening at any time, imperil the prosperity of the whole country, while it is easy to see that if it should occur to-morrow, so soon after the San Francisco fire, there would not be an insurance company in this country and few in any that could survive the strain. New York has a good fire-department, and it is, with its surrounding rivers, well arranged for fighting a big fire. Almost every week large fires occur there, anyone of which, seemingly, might well be the starting-point for a conflagration, but somehow or another they have not been, and because they have not been people seem to feel that they cannot be. But luck is not always of one kind, and a large fire may occur at some time when the streets are impassable because of snow, while the wind is blowing a gale; or, in consequence of an anarchistic outbreak, fires may be started in many parts of the city at the same time. In such event the lack of fire-breaks of really fireproof buildings stretching from river to river at intervals up and down the island, such as we recommended some time ago, would be sadly felt.

MAN'S inhumanity to man is illustrated better by few things than by the way in which the erection of a hospital or asylum is resisted by the owners of property near the projected site. These protests are very likely to come with most virulence from persons—as often persons of general intelligence as those really ignorant—who, having one child sick with a contagious disease, unblushingly send to school daily the other children of the family who have not yet "come down" with the disease. Quite recently Dr. Ellen Stone, of Providence, R. I., finding she had under observation quite a number of tuberculous children, bethought her that it would be beneficial to gather them for the daytime into a small out-of-door camp, and so persuaded her father, the well-known architect of that city, to give her the use of some property on the East Side where the camp with its miniature shelter pavilion could be established. No sooner did the project get noised about than a lively spirit of protest developed and, curiously enough, among the protestants was a gentleman who fills a professorial chair in Brown University, he and his fellow expostulators being quite oblivious of the fact that the children in question in their previous unguarded state, living at home amid undesirable surroundings, would be a greater menace to the community than they possibly can be in a little day camp.

MANY an owner, when confronted with his architect's final certificate, including the extras, must have felt like vowing he would never pay it, because the architect "must have been crazy when he signed it," and recently one such owner has produced this very plea in the New York Supreme Court. When the "Ansonia," at Broadway and Seventy-third street, was built, a few years ago, the assignee of the contractor had finally to proceed against the building's owners, suing for $90,000. The result of prolonged litigation was that the creditor recently secured judgment in the Court of Appeals in the sum of $73,000. The owners now seek to have this verdict set aside and the case reopened because, as they allege, they have recently learned that the architect of the building, Mr. Paul E. DuBoy, is now and has for some years been confined in an asylum for the insane near Paris, and it is their belief that he was insane when, in 1903, he signed the final certificate, and hence that that instrument can never have been legally validated.

ONLY in cases where a client's "cussedness" is marked and unmistakable do architects feel like resorting promptly to the courts for aid in collecting their commissions. In other cases this disagreeable step is postponed as long as possible, but the fate that has overtaken Messrs. Hornblower & Marshall, of Washington, shows that it is possible to pay too much regard to the finer feelings. These architects did certain work for the George Washington University, on the ordinary vague verbal understanding that commission for the work at the usual rate should be properly paid. The work, the designing and building of the Medical School and the carrying out of certain alterations, proceeded satisfactorily and the architects collected, on account, payments aggregating $5,485.45. When, however, the job was actually finished and they presented their final bill, complete to the last decimal, they found to their surprise that there was no disposition to liquidate it at once. As a university is a very good client with which to keep on good terms, the architects decided not to press the claim, but let matters drift. Finding at length that patience had ceased to be a virtue, they brought suit for the unpaid balance, $1,605.64, only to be confronted with the University's successful plea that the claim was outlawed by the statute of limitations!

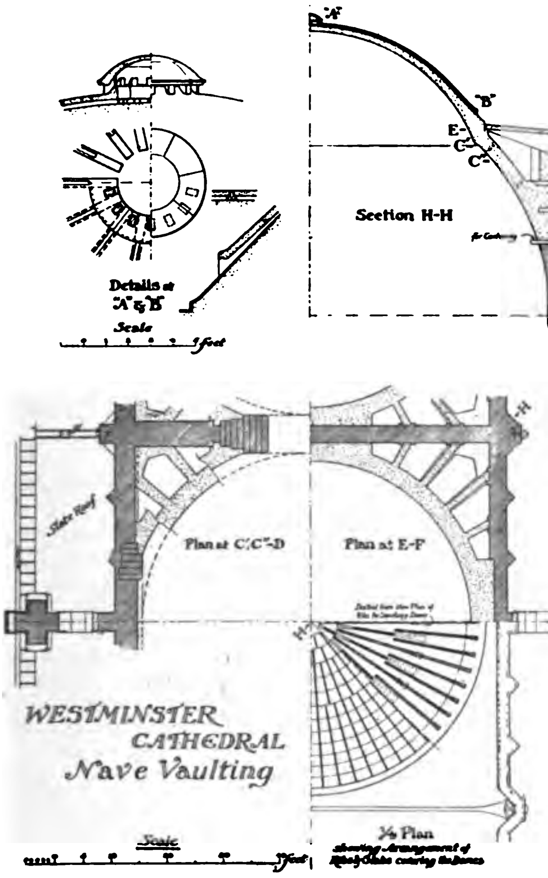
THE American architect who thinks it such a hardship to have to win his job in competition, in place of having it politely tendered him on a salver, should take heart of grace in that his lot is less hard than that of M. Maquet, a Belgian architect of note and of such skill that, thirty-one years ago, his design for the Mont des Arts, at Brussels, carried off the prize from one hundred and sixty competitors. But the structure, whatever it really is to be, was not built, and six years later, in 1882, a new competition, after an amended programme, was held, and again M. Maquet was successful, but again there was no concrete result. The same maneuvers were repeated in 1887 and in 1894 with identical results in each case, the three things really established being M. Maquet's continuing and abundant good health and courage and his superiority as a designer. At length, in 1903, the State was induced to join with the municipality in carrying out the undertaking, and M. Maquet's plans were finally and formally adopted for execution, but it seems questionable whether actual work has been begun, for we find, four years later, that the unfortunate architect, unable to collect his commission, weary of waiting and noting, doubtless, that his life-expectancy had less and less value each year in the actuaries' mortality-tables, has just brought suit against the city of Brussels for his commission in the sum of 225,000 francs.

WESTMINSTER CATHEDRAL.[1]—II.

THE circle, developed by the pendentives, is sixty feet in diameter; the base of the dome is corbelled over from this, so that the springing is clearly defined and a salient angle at the junction of the two surfaces is thus avoided, for the convenience of the mosaic workers of a future generation.

The thickness of the domes at the springing is three feet, which is gradually reduced to thirteen inches at the crown; the curve of equilibrium is, therefore, well within the material.

The domes were turned on closely-boarded centering, in a series of superimposed rings of concrete, averaging four feet in width. The concrete was not reinforced in any way. The centering consisted of radiating trusses supported from the ground on uprights ninety feet in height made of stout planking, bolted together, so as to break joint, and cross-braced at intervals. It was, of course, important to have the centering perfectly rigid to preserve the true curvature of the concrete until it had finally set. Full responsibility for the centering rested with the builder who had contracted to carry out the work; and if his method lacked the daring and skill of a Brunelleschi, or a Fontana, he



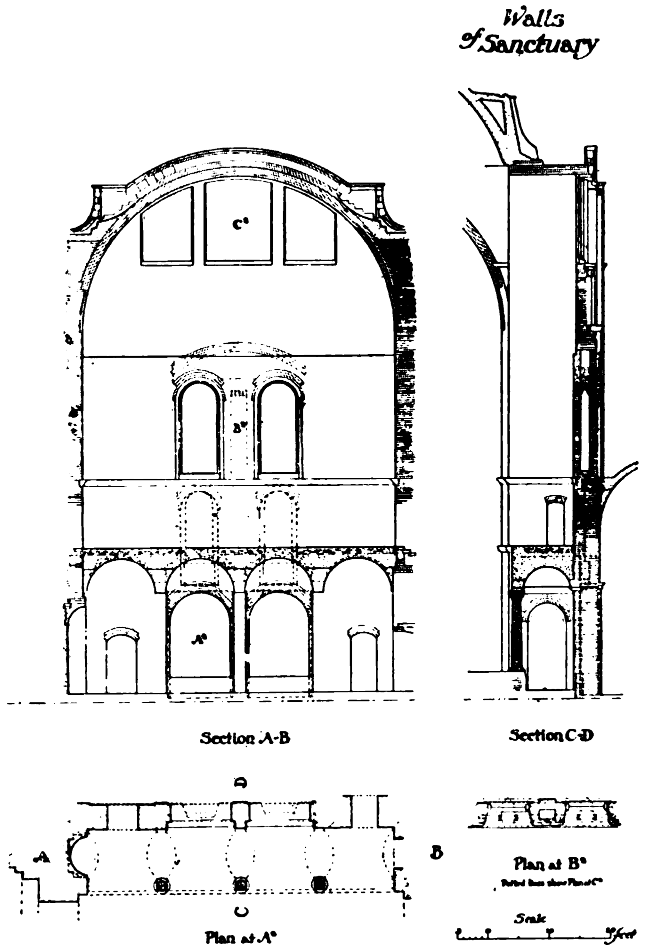
certainly incurred no risk, and did not stint the timbering. The eastern dome of the nave was turned first, then the dome of the sanctuary, next the middle dome of the nave, and lastly the western dome. Their construction occupied about fourteen months.

The independent external covering of the domes is formed of three-inch artificial-stone slabs, cast to the curve. They rest on radiating ribs five inches deep of similar material, fixed on the concrete, and rebated to receive the slabs, thus leaving an air-space of two inches between the inner shell and the outer covering, the object being to render the temperature of the interior more uniform. The top and bottom joints of the slabs are rebated. At the springing and at the crown the spaces between the ribs are left open for ventilation, and to prevent the wet being driven into the cavities at the top a circular raised curb is formed on the top edge of the upper slabs, over which is placed a domical capping that allows the air to circulate freely. A reference to the diagram will make this clearer to you.

To form the outer covering, more than 600 slabs were required for each dome; the exposed surface is, therefore, an elaborate network of jointing, and we cannot but feel that an outer coating of homogeneous asphalt would have been more impervious. You will note that by rebating the ribs for the slabs, each radiating section of the covering is kept in position independently of the rest.

The concrete flat roofing around the domes is covered with asphalt that passes up the lower portion of the dome to a height of about four feet six inches under the outer covering, where it is keyed into the concrete.

The eastern portion of the cathedral, comprising the sanctuary, the lateral chapels, and the choir, presents a system of construction essentially Byzantine, the luminous corona of the sanctuary dome being raised aloft on vaulting that seems to be independent of direct support. This buoyancy is due to the extensions that open out on all sides, equal in span to the dome itself. The enclosing walls of the sanctuary on the north and south have very materially affected the design of the eastern chapels. Originally, these chapels were to have been enclosed by slender arcades, on marble columns, corresponding with those of the organ galleries adjoining; but, as in the case of the chapels of the nave, it was soon found that these arcades would



not be sufficient to sustain the weight of the walls above which are the highest in the building; so the columns were changed into brick piers, and the two end bays of the arcades were filled in, leaving only two bays open in the middle and a couple of narrow doorways at each end for access to the aisles. Over the filled-in bays are built the solid portions of the outer wall, against which the organs will probably be placed, while over the two open bays is built the lighter portion of the wall, containing the windows.

The weight of this central part does not, however, entirely depend on the arcade below, for, above the two lower windows a relieving-arch is turned that transmits the weight of the upper part of the wall to the solid portions at the sides, and to still further reduce the weight that portion of the brickwork under the relieving-arch and between the windows is built hollow.

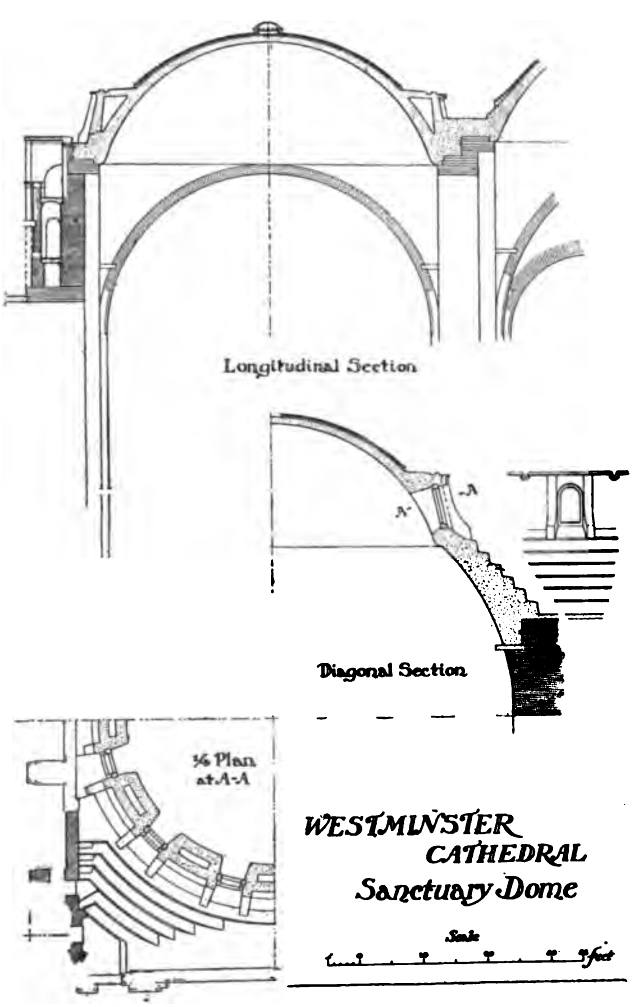
The organ-galleries are independent factors of the construction and, like the galleries of the nave, were left down until the main parts were built. The concrete vaulting of these galleries and the western gallery of the nave is not let into the walls at the back, but supported on brick and stone corbelling so that

[1] A paper by Mr. J. A. Marshall, read before the Architectural Association, April 12, 1907, and continued from page 195, No. 1637.

the walls are not weakened; the concrete was, however, keyed to the wall by projecting courses of brick, and as an extra precaution the columns supporting the vaulting of the organ-galleries are tied to the brick wall by gun-metal ties, while for the west gallery of the nave ties were inserted at the floor level of the gallery where the wall of the narthex has most resistance.

The side galleries of the nave have no supporting wall at the back excepting that next the campanile, but the arcades that carry the vaulting are comparatively short and resistance to any forward tendency is provided by the main piers. It may here be mentioned that the vaulting of the crypt was also delayed until the superstructure was finished.

You now see that in no part of the cathedral does the main structure depend on marble columns, and this arrangement will be appreciated by those who have experienced the uncertainty of getting large marble monoliths delivered by a stipulated time. The Byzantine builders had the advantage in this respect; their quarries were often the dismantled basilicas and temples of the Romans, where they found columns ready to hand. But the primary objects in delaying the subsidiary parts of a building



are, as you know, to give the main parts time to find their permanent settlement, and to avoid interference with the scaffolding and exposure to the weather. The accumulation of rain-water in the pockets of the upper vaulting of the cathedral was sometimes a great nuisance, and holes had to be left in the brickwork for temporary shoots or spouting. During the very hot weather when the domes were being turned they were sprinkled with water to prevent the concrete setting too quickly.

We are now in a position to examine the eastern dome that differs in several respects from those of the nave. Unlike the latter that seem to rest on the flat roofing of the church, the dome of the sanctuary emerges gradually out of the substructure, the extrados of the pendentives forming a pyramidal series of offsets or steps that follow the plan of the dome. The reason for thus exposing the pendentives outside was to limit the height of the supporting walls on the north and south so as to give greater elegance to the eastern turrets and to bring this part of the building into closer harmony with the choir. To further this object the vaults over the organ-galleries are also exposed, the whole group presenting a subtle gradation of parts, more Oriental than the rest of the building, and perhaps more expressive of the internal arrangements.

The abutment for the main supporting arches of the sanctuary dome is provided by the staircase turrets on the east and by the transept piers on the west, while for the dome itself abutment is provided on the north and south by the vaults over the organ-galleries, on the west by the dome of the nave, and on the east by buttresses built on the wide supporting arch that forms part of the vaulting to the choir; these buttresses are stiffened by the outer wall of a passageway that passes through them to provide communication between the staircase turrets.

The circle developed by the pendentives is fifty-two feet in diameter. On the closely-boarded centering for this dome, other centering had to be constructed for the window openings, the reveals of which represent a series of counterforts all round the dome. Centering had also to be constructed for the wall of the drum or circular podium designed to disguise the counterforts and to protect the glazing from the drainage of the dome.

The cavities between this wall and the shell of the dome are covered by slabs of concrete weathered to a sunk gutter or channel near the outer edge that conveys the water to projecting spouts or gargoyles placed between the windows. The flat of the drum is covered with asphalt that passes partly up the dome under the outer covering as before described. The exposed vaulting and the pendentives around the dome are also asphalted; the wall of the podium is cemented. All cavities are ventilated by drain-pipes communicating with the outer air.

It would be convenient, now, to inspect the upper part of the choir, but we had better perhaps descend by one of the eastern turrets and begin at the bottom, on the very foundations of the church in fact. The floor of the choir is some thirteen feet above that of the nave, so it was almost impossible to avoid the formation of a crypt, only a very slight excavation being necessary to get the required height. The depth of this excavation was, however, limited to a level, below which it was impossible to go by an existing platform of concrete about nine feet thick that extends over more than half the site and served as the foundation for an earlier building.

As the top surface of this platform is practically the floor of the crypt the architect was anxious to dispense with footings around the apse inside, a slight departure from the Building Act that was graciously permitted; but on the outside footings were provided, though they were not a structural necessity. At that time these footings were covered by the ground that rose above the floor of the crypt, but a subsequent alteration of the levels led to their exposure and they are now again concealed by a retaining-wall that forms a low circular podium between the buttresses.

The eastern termination of the cathedral suggests the Romanesque or Lombardic style, if you will, of Northern Italy; the crypt opening into the church, with the retro-choir above, closely following S. Ambrogio's, Milan; the open colonnade under the eaves; the timber roof over the vaulting, are all familiar features. The huge buttresses, however, give distinction and resist the pressure of a vault having a span of forty-eight feet.

Up to nearly half its height this vault is a solid mass of brickwork roughly corbelled over to the curve and faced with concrete. Above this level the vault is a concrete shell eighteen inches thick at the bottom and twelve inches at the crown.

A retaining-wall of concrete is built on the haunches to receive the counterforts or sleeper walls, on which are placed the principal trusses of the roof. The buttresses of the apse rise to the height of the retaining-wall and the two are connected by massive concrete lintels formed across the gallery behind the buttresses. The gallery is covered with concrete slabs, cast *in situ*, that form a flat around the timber roof. To prevent the arcades of the gallery being pushed out by the expansion of the concrete the flat and the lintels were kept clear of the brickwork until the concrete had thoroughly set; the joints were then made good.

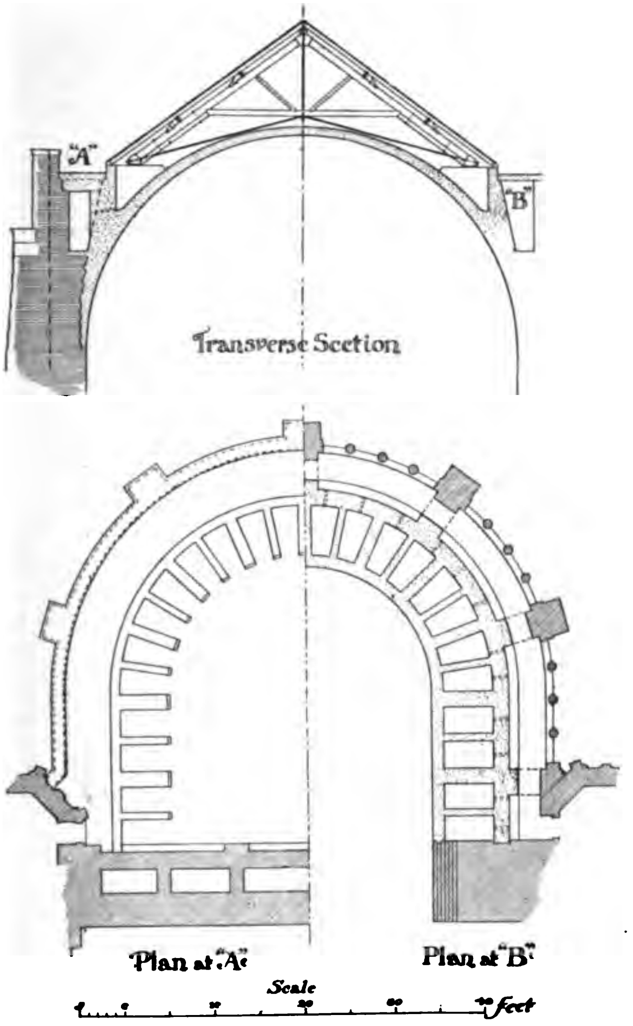
The retaining-wall above referred to was raised a little above the flat to form a curb on which is placed the wood plate for the rafters.

The asphalt covering of the flat is turned up the curb and under the plate, the joint being covered by the lead apron flashing of the eaves. The roof is ventilated by drain-pipes that pass

through the retaining wall to the gallery. To convey the water from the asphalt-flats throughout the building to the rain-water pipes a dish is formed in the concrete and at the bottom of the dish or cesspool a curved length of glazed earthenware drain-pipe is built in with the socketed end upwards, so that the asphalt could be turned down or dressed into the socket.

All rain-water conductors that are built into the brickwork are formed of glazed and socketed earthenware pipes.

But we must not linger over these details, neither have we time to ascend the campanile. We wish, however, before closing this section of our subject to draw your attention to two singularities in the construction that call for some explanation. First: Why should the vaulting in some cases be entirely of concrete and in others entirely of brick? Secondly: Why should some of the vaulting be protected by extraneous roofs while in other places its surface is fully exposed to the weather? Obviously, where the shell of the vaulting is of a graduated thickness, and curved on plan concrete is the strongest and most adaptable



WESTMINSTER CATHEDRAL: VAULTING OF CHOIR

material to use; the complications of groin-vaulting are also most readily cast in this material. So we find, for the pendentives and the domes, for the vaulting of the choir and chapels, for the more complicated vaulting of the crypt, aisles, baptistery, and porches concrete has been used, but for the vaulting of the transepts and the corresponding vaulting of the triforia brick is the material employed, in order that the deep soffits of the brick-supporting arches in front may appear as part of the vaulting behind and the line of junction between the two should not show, thus insuring a uniformity of surface texture until the unaffected dignity of the interior is impaired by the application of something more assertive and restless.

Respecting the contrariety of the roofing, it will be as evident to you as it was to the architect that a timber roof over the nave and sanctuary of low pitch would have been uncouth and harsh; such a roof would also have been commonplace; whereas these parts of the building have now a distinction not unpleasing and most interesting. Rising as they do from the mighty and unbroken podium afforded by the lateral chapels, they appear disdainful of protection and defy the elements.

But there is a law of contrast as well as of analogy. The limitations of this law are, however, easily exceeded and a watchful eye is necessary to prevent the intrusion of discordant elements. At the Westminster Cathedral the most striking instances of its application are afforded by the campanile and by the roofs and turrets of the transepts and the choir. Structurally, it would have been quite possible and more consistent to have exposed the vaulting outside throughout the building, and we can imagine what the effect would be. But the Greeks did not always expose their statues to the cold; they appreciated quite as much as we do the charm of the rippling garment; even Aphrodite was allowed the luxury of a pair of sandals. And so at the Westminster Cathedral the rounded surfaces of the vaulting are not everywhere exposed, but discreetly concealed in places by extraneous roofs suggestive in a measure of the forms beneath.

A piquancy and an interest are thus imparted to the design. We may theorize about discordant elements, but we are forced to acknowledge the refining influence of the artist's skill.

When we consider the execution of this great design, the way in which the various materials have been put together, it will be admitted that the extreme accuracy and neatness of the work are in striking contrast to that spontaneity and directness of purpose so evident in the Christian architecture of bygone times. These early buildings denote a readiness of execution resulting in a variation of texture quite unattempted, yet interesting and beautiful, and we like to think that this is not entirely due to the hand of time.

We also like to believe, though it may not be true, that when the ancient workman was bedding a stone or laying a brick or driving a pin through a tenon he was not ashamed to finish these slight operations before responding to the imperative call of the foreman's whistle. Nowadays it would seem a man may not do this; his work has no such fascination for him; at the shrill note of the clarion the implements of his toil drop from his hands like red-hot iron and he rushes from the scene as for very life. In these circumstances the architect feels that in the more tranquil atmosphere of his office, when the sublime and the beautiful are not forgotten, he must arrange for every stone and every brick throughout the building; nothing must be left to the workman's discretion or ingenuity, the serenity of the execution must not be impaired even by a putlog hole—and this reminds us that no such holes were permitted outside the Cathedral, where the scaffolding was arranged as for masonry.

The extreme precision of the execution just referred to, if it does not really betray the hand of the workman, is certainly expressive of Mr. Bentley's desire to soften down the asperities of architectural design. Anything harsh, uncouth, or "out of gear," as he termed it, was always avoided, and if this ultra carefulness sometimes led to a lack of vigor or directness it can truly be said that the mass of his buildings was never frittered away, the dignity of an unbroken roof or the surface of the walling was left unimpaired, the fenestration was faultless, the detail telling yet refined.

(*To be continued.*)

AN ISLAND CATHEDRAL FOR BOSTON.

MR. William Howe Downes, art critic of the Boston *Transcript*, has this to say in a recent issue of that newspaper:

"Now that a cathedral for the Episcopal Church of this diocese seems assured, and the action taken by the diocesan convention in Boston on May 2 makes the project assume concrete form, with the munificent bequest of Miss Mary Sophia Walker as a million-dollar nucleus for the fund, it becomes a vital question whether there exists an appropriate site for the structure, or whether a site must be created. The choice of a site for a cathedral, as for any important edifice, is not an easy matter as one might suppose. In looking over the map of Boston and its suburbs, it will be found that cathedral sites do not abound, that there are very few open spaces suitable for such a purpose which are not objectionable, defective, or æsthetically impossible.

"Under these circumstances, it is natural to revert to the recent suggestion of the architects who, in the report of the committee on municipal improvements of the Boston Society of Architects, proposed the creation of an island in the Charles River Basin.

This scheme probably struck most of those who read the report as somewhat fantastic. The more it is considered, however, the more it appeals to the imagination as possessing great possibilities. As a site for a great cathedral, nothing could be better than an island in the middle of the Charles River Basin.

"It is natural to suppose that the idea was suggested by the Ile de la Cité in the Seine at Paris, but it makes no special difference how or where it had its birth, so long as it serves our own purpose and is feasible. An island extending from a point nearly opposite Deerfield Street to a point just below the Harvard Bridge, or to a point just below Dartmouth Street, would be equally accessible from Boston and Cambridge. It would occupy the strategic centre of what we hope is to be the future court end of the city. Being public land, the island could be made subject to whatever real estate restrictions might be deemed expedient for it. No other site would offer for a cathedral the unequalled advantage of perfect isolation, with the absolute impossibility of ever being hid from view by surrounding buildings.

"If, as I hope, the cathedral is to be a Gothic building, it ought to have a very lofty, beautifully outlined and well-proportioned stone tower, in which case the island site would insure perpetual and uninterrupted view of this tower from every point of view, with the reflection of it in the surrounding waters. Very many of the best Gothic cathedrals in the world suffer greatly from the encroachment of squalid surrounding structures. On the mainland the only means of guarding against such a deplorable condition would be to obtain control of a large amount of surrounding territory at vast expense.

"It seems to have been assumed by some persons that the Church of St. Botolph at Boston, England, would afford a desirable model for a cathedral in this city. This is an interesting suggestion, but it seems to me, on serious reflection, that it would be a mistake to copy any existing church. The old Boston "Stump" is a fine landmark, but what we want is a landmark of our own, and there is no reason in the world why we should not have it.

"We have in Ralph Adams Cram an architect of the first order, who is capable of giving us a Gothic cathedral plan worthy of the diocese of Massachusetts, an architectural monument which travelers would come from foreign countries to see, even as we go to Lincoln, York and Canterbury to-day. I do not say that this gigantic work could be done in a day or a year; cathedrals are not built in that way; but it can be done, and done in the right way, to last.

"Time is a matter which is of little importance. Most of the great cathedrals were from two hundred to four hundred years in the building, and when you see them you wonder it did not take longer.

CHURCH OF THE DISCIPLES, BOSTON, MASS.
James Purdon, Architect.

"Plan No. 1 for an island in the Charles river (figure 36 in the *Report* of the Boston Society of Architects) is signed by R. A. Cram, and plan No. 2 (figure 39) is signed by Arthur S. Shurtleff. The only essential difference between these two plans is that Mr. Shurtleff's proposed island is longer than Mr. Cram's, extending eastward to a point just east of Dartmouth Street. The proposed site for the cathedral is the same in both plans—the west end of the island, about opposite Deerfield Street, Boston.

"The width of the Charles River Basin at the point where it is crossed by the Harvard Bridge is 2,200 feet. The proposal is to make the island 1,000 feet wide at its broadest part, leaving a 750-foot waterway on the Boston side, and a 450-foot waterway on the Cambridge side. The architects reason that the creation of the new land would pay the cost of the filling; besides this, they argue that it would save eventually an immense sum in bridge-building by shortening the length of the bridges to be built in the future. They foresee that bridges will one day be needed at Dartmouth Street and at Deerfield Street, and under the conditions of Mr. Shurtleff's plan these two new bridges would be about 1,000 feet shorter by the creation of the island. If Harvard Bridge is ever to be replaced by a heavier and more adequate bridge, this, too, would be shortened by the same distance, nearly one-half its length.

"Mr. Cram's proposed island follows closely the Ile de la Cité in Paris. Mr. Shurtleff's island is about thrice as large. It would, in fact, create some six million square feet of new land. This would be an enormous undertaking, and its expense would be formidable. No attempt is made by either of the architects to estimate the cost of making the proposed islands. A compromise plan might be expedient; that is to say, two islands might be created, one in accordance with Mr. Cram's scheme, and a second one opposite Dartmouth Street, with a wide gap between the two islands, extending, say, from opposite Exeter Street to opposite Hereford Street. If the creation of new land should be found to pay for itself, it would be easy to continue the filling-in-work in the future, so as to connect the two islands, as in Mr. Shurtleff's plan.

"At present I think not one Bostonian in a hundred realizes the marvellous possibilities of the Charles River Basin as a central metropolitan feature of our Greater Boston landscape. The dam is as good as an accomplished fact, and the fresh-water basin which ten years ago seemed like an iridescent dream "has come to stay." No town in the world ever had such an opportunity to make itself world-famous for stately beauty as Boston has in this Charles River Basin, and if it takes a century to develop the feature as it ought to be developed, it will still pay a thousandfold.

"Now in all this magnificent scheme the island, which Mr. Cram's imagination pictures forth for us as a reality, with a cathedral at its western extremity, and the executive buildings of the Greater Boston (which is surely coming) at the other end —this island is a crowning detail and an essential factor. And why not make an island, since the whole Back Bay is "made" land? Was there ever a real estate operation which paid better returns than the filling-in of the Back Bay?

"Notre Dame de Paris is the sole example of a great metropolitan cathedral built upon an island. The emplacement of Notre Dame is certainly very fine, but it would have been still finer if the space to the north and south of it had been kept open. The west front has a large square in front of it, which affords a good view of the rich façade and towers, and the east end, with its superb flying-buttresses is advantageously seen from both banks of the river; but the sides of Notre Dame, which are very rich and interesting, are masked by a crowd of buildings no farther away from the cathedral than the width of a street. The proposed site for the Boston cathedral on St. Botolph's Island would be better in several ways than the actual site of Notre Dame de Paris. In the first place, it is put on the west end of the island. The west front would face the river, with nothing between it and the water but a great open place planted with trees and shrubbery. If the western towers were approximately two hundred and twenty-five feet high they would be at about the same distance from the water on either hand as their height. The island would gradually narrow to a point at this end, bringing the shores near enough to the cathedral on the north and south to warrant the exclusive use of all the land at this extremity of the island by the cathedral grounds and buildings. Mr. Cram happily places the proposed Deerfield Street Bridge to the westward of the cathedral site, and arranges for a circle (or a circus, as they call it in London) in front of the cathedral. His sketch shows cloisters, chapter-house, lady-chapel, library and other customary connected structures appertaining to a cathedral. These extend both north and south of the main edifice, which has a long nave, a square apse, a rather faintly defined transept, and a lofty square tower at the crossing—not a mongrel pyramidal tower like that in the plan of the New York cathedral, but a true Gothic tower of the English type which our good friend Baedeker always refers to as 'Perp.'

"Mr. Shurtleff has apparently committed the solecism of making his cathedral face the east. He also suggests a building too small in scale, relatively to the size of the island. On the whole, Mr. Cram's plan has been more thoroughly studied, as will appear when one makes a comparative examination of the plans, and his island is better proportioned. It looks very real and feasible. Mr. Cram wishes his island to have high stone embankments crowned by balustrades, broken by statues, 'with domes and towers of public buildings, civil and ecclesiastical, rising above a circle of trees, the whole reflected in the still water,' etc. The vision is attractive, and, although it is now but a vision, it is to be remembered that no great public improvement of any kind ever created in the history of the world would have been realized if it had not been first conceived in the imagination of someone.

"Great schemes are always called visionary when they are first broached. It was not so very long ago that the Charles River Basin improvement was called visionary. 'Your old men shall dream dreams, your young men shall see visions,' said the Prophet Joel. There would be no progress if it were otherwise. It is the dreams and the visionaries, after all, that make possible great achievements. The imagination of the architect, who can see in his mind's eye how a plan is going to work out, is the endowment that makes him an artist."

COMMUNICATION

THE CATHEDRAL OF ST. JOHN THE DIVINE: A CRITICISM.

To the Editors of the American Architect:

Dear Sirs:—I do not know much about the organization which is directing the work of building this edifice, but I notice in *Scribner's* April number an article by Mr. C. Grant La Farge which appears to be written in justification of the design, or in reply to certain criticisms, though I do not know from whom they emanated. Interest in such work prompts me to offer a few notes for publication, if you can grant the space.

Taking the article as it stands, I find at the outset the statement that "the average American [which I suppose means the client here] demands a building like something [presumably ancient] already extant in Europe." [By the way, he has no difficulty in getting it; but, generally speaking, in piecemeal form taken from books and photographs, and combined in a more or less consistent entity. The Cathedral of St. John is no exception apparently, but the homogeneity it will present when completed is, to say the least, a moot point.]

The views given show very important characteristics differing from anything that Europe can show. A church tower 100 feet or more square capped by a spire, and Perpendicular windows 50 feet wide and about 60 feet high, over and among round-arch work, are suggestive of three and a half centuries difference in period and style. And practically, unless another Carnegie when these windows are made is at hand, willing to present stained glass to modify the light they admit, it will be very troublesome to the eyes of our descendants, not to mention the extra cost of warming in perpetuity which so much cold surface necessitates. This will be no small item, coupled with the cubical contents of a crossing and lantern to warm, comprising alone about *two and a quarter million feet!*

In analyzing the design generally, we find huge structural work at the last named point, already executed on the lines of Santa Sophia; suitable, and apparently intended to support a similar dome; an arrangement of pier unsuited altogether for a Gothic building, the principle of which is, never to provide a structural feature which is not absolutely required for the work to be done.

Next, we find an apsidal-ended choir in the style of the fifteenth century *as to its shell*, with enormous Perpendicular windows lighting chiefly blank and unseen wall-space; but giving so little light upon the altar—the focus of all eyes—that *skylights*, such as one would use in a factory, or studio, seem imperative though anomalous. I know of nothing in the cathedrals of Europe justifying such an apologetical procedure. The waste of money in the upper third part of this outer wall seems self-evident; and if, externally, it adds to importance, it certainly does not to either architectural fitness or beauty.

Then, within this fifteenth-century shell, a Romanesque arcade of colossal columns placed close together carries, by narrow stilted arches, a ramped semi-dome, ill-lighted, nearly all its contour in shadow, and very ill-adapted for display of mosaic. Too little light here, and far too much in the nave. The contrast between plain, huge columns of granite—a material indistinguishable a little way off—and highly ornate paneled screenwork and window is questionable, both as destroying scale, by dissimilarity in size, and by suggesting two epochs of construction, which is spoken of now as "falsifying history." As if intended to mark the contrast still more, the lower arcade of the choir is of less height than the triforium opening over it.

Another variation from general European practice (although there are precedents) is in making the choir vaulting about forty feet loftier than the nave. Scarcely any architect would assert that the useful Guastavino principle of roofing complies with the dictum laid down by Mr. La Farge that "true vaulting is the only possible thing," though, *per se*, a legitimate enough material. "The average American" may question it, even as I venture to do.

In regard to the plan shown, it is stated that it may be revised, and I venture to think that it *is* desirable; but, without pulling down the huge piers, nothing much can be done to the crossing to lessen obstruction. True, it will contain a large congregation, if hardy enough to sit through a service under a vast column of cold air, but most people in the nave and transepts beyond will not get much, or any, view of the choir or altar, even if they hear the sermon. The circular fronts to the transepts as a matter of taste have a questionable effect, and on account of height and width resemble a fortress church. In round apses in Europe the outer wall is low, and the inner one (over the arcade), which is concentric, leads the eye inwards and upwards, and retains the pyramidal effect of stability. The suggestion that these transepts will "serve to receive memorials" is unsatisfactory. It is now felt that the huge groups or life-sized statues, such as are seen in Westminster Abbey, are quite out of place in a church, and that the mural or flat brass on the floor is sufficient record. In this case, only the first named would doubtless be entertained, and walls, say 100 feet high, in any case are not needed for them. The outer part might as well be screened off at half distance from the crossing, so far as its possibility as part of the auditorium is concerned.

Mr. La Farge writes of the great obstruction by columns at Rheims. That cathedral was intended for the Romish ritual and not for Anglican. In spite, however, of their number, the actual blocking of the choir in that large and broad area is much less than it is at St. John's. The same fault applies to the choir itself. One notes eighteen columns crowded in that portion and only eight in the nave, where the very wide bays go to the opposite extreme of expansion, destroy the scale, and take off from the appearance of length also. As to the walls of the nave going up "in one unbroken line," it breaks the "traditions of Gothic," which is said at the outset to give us the best motif. It is an absolutely Classic method and wasteful of material, while the placing of clerestory upon the inner wall would give not only the same floor area, but admit also ample light. With seven chapels at the east end, and a crypt available if needed, chapels each side of the nave are unnecessary in a Protestant church. If a large morning chapel were required, one of the transepts could be adapted without being missed.

Although important collaterally, space forbids much reference to details. The "sort of pendentive vaulting," as the method of passing from square to octagon sides of lantern is little better than a sham; while the general design of string-courses, ornaments, and general "trim" is weak, and out of harmony with a round-arch style of architecture.

To sum up the result of a consideration of the building in its present state, it seems that much of the huge framework is a needless outlay, superfluous in a Gothic cathedral; that a great mistake has been made by changing a possibly good Byzantine design into a bad Gothic one; that matters have gone too far to rectify them in choir or crossing, and that a reconsideration of the nave should be made before it is too late, to save money, and avoid a still more hybrid effect. The suggestion to leave all judgment to a future generation is a shirking of responsibility. Suppose that "an enlighted people's" judgment is adverse when the mischief is of years standing! Is this not likely to be the case, when constant changes are made, and there is, and has evidently been from the outset, *no settled plan*, worked out, laid down, and adhered to? In the hands of the talented and autocratic Richardson the present state of things could not have happened, and under contract the work would by this time have been two-third's completed, before the public lost interest. I am no captious critic, have no interest to serve beyond the desire to see a monument of the twentieth century worthy of a great city. The architects, having to deal with committeemen with different fancies, need to take a firm stand, repress and guide them, or failure must result. Yours obediently,

CANDIDUS.

ILLUSTRATIONS

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NOTES AND CLIPPINGS

THE WATERLOO VASE.—The first Napoleon adopted several measures to celebrate his victories, and in that way painters and sculptors obtained many important commissions. He was not satisfied with statues, and he resolved to have the biggest vase in the world fashioned in marble as a field for the representation of his victories. He obtained three of the finest blocks which Italy could yield. But before they were handed over to the sculptor the French Empire collapsed. The Grand Duke of Tuscany considered they would be an acceptable present for George IV., who, recognizing the purpose for which they were originally intended, gave a commission to Sir Richard Westmacott for a colossal Waterloo vase, and the marble would thus by one of the ironies of fortune be made to represent the downfall rather than the triumph of Napoleon. When the work was completed it was about 16 feet in height, the largest diameter was about 10 feet, and the weight was no less than 20 tons. When King William IV. came to the throne the vase appeared to him to be a sort of white elephant in stone. The National Gallery, which was then a new institution, was considered a suitable depository for it, and in 1835, before Wilkins's building was completed, the vase was placed in the hall. It was soon recognized as a nuisance, for it was an obstacle to the ingress and egress of visitors; and besides, in days when iron or steel girders were not available, a dead weight of 20 tons on a confined area was fraught with danger. The opening of the South Kensington Museum afforded an opportunity which was seized. But it was even more dangerous in its new abode, and the resolute Henry Cole had it taken to pieces and put out of sight. The trustees of the National Gallery were, however, in an official sense its possessors, and inquiries about the manner in which they discharged so onerous a trust were made from time to time. But the area of the National Gallery was more insufficient than before, and the dangerous gift was kept at a distance. Then the subject was brought under the consideration of the Office of Works, without avail. Finally, His Majesty, with his customary good nature, graciously offered to allow the unfortunate vase to be set up in the grounds of Buckingham Palace, and there it is, for the present at least.—*The Architect.*

THE EXCAVATION OF HERCULANEUM.—The Under Secretary for Public Instruction, Signor Ciufelli, replying in the Chamber of Deputies on April 24 to a question on the subject of the excavations at Herculaneum, said the Government intended soon to begin the work. It would be given a thoroughly national character, but the advice of foreign experts would be gratefully accepted. Signor Ciufelli explained that the nature of the work will not permit of extensive operations. It would be necessary to proceed gradually and thus find out the best way to continue the work. If the present, ordinary appropriation turns out to be insufficient, the Government will present a demand for further funds.—*Exchange.*

CAST-IRON AND ITS QUALITIES.—The strength of cast-iron has recently been the subject of a discussion by the Birmingham Association of Mechanical Engineers. To some engineers all cast-iron is alike; but, as Mr. F. J. Cook, who introduced the subject, showed, those who are brought much into contact with foundry work know that the strength, hardness, and ability of cast-iron to resist corrosion vary enormously. Much depends upon the conditions attending the casting, and in particular upon the rate of cooling after running the molten metal. It is a matter of common knowledge that cast-iron can be made exceedingly hard and strong by casting it in an iron mould, the iron of which acts as a chill. The rate of cooling, and hence also the hardness and strength of a casting, is greatly influenced by the shape and thickness of the metal, and in general a heavy casting is weaker than a fairly small one run from the same metal. The amount of carbon present in the iron is of importance, and especially so the form in which it exists, whether combined or in the separated (graphitic) form. The latter iron is the softer and easier to work. Silicon up to about 2 per cent. has a marked effect on iron, increasing the strength. Sulphur tends to make iron hard but brittle by increasing the combined carbon. Manganese has a somewhat similar effect. Either too high or too low a casting temperature leads to weak castings, whatever the quality of the iron used.—*The Building News.*

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SOCIETIES, PERSONAL MENTION, ETC.

MANY a young architect, who has begun his career by treating contractors if not with haughtiness at least with condescension, has found himself seriously indebted to them before long for some kindly hint or warning in matters of construction that has spared him the shame of responsibility for a disaster. It is the part of prudence to listen patiently to anything in the form of a remonstrance that comes from a contractor or intelligent mechanic, and the advice is as applicable to the relations that exist between contractors and sub-contractors as between architects and contractors. That this is so is shown by a case recently decided by the full bench of the Massachusetts Supreme Court that arose out of the building of the Hotel Somerset in Boston. The general contractor for that building, the Webb Granite and Construction Company, sublet the metal-work to the Eastern Expanded Metal Co., who carried out the work acceptably until it came to erecting the roof; then the sub-contractor refused to go on with the work, alleging that the roof had not been designed in accordance with the building-laws. As the general contractor refused to pay for the work done on the lower stories, claiming breach of contract, the sub-contractor brought suit and the court has just ordered their claim, $28,809, to be paid in full. The court ruled that, the roof design having been proved to be in violation of the stipulations of the municipal building-law, the contractor could not hope to enforce its execution, and that the contract which was sought to be enforced was illegal and unenforceable, whereas the sub-contractor could fairly exact payment for the work actually and lawfully done.

TO the "man in the street" who, as he walks along the Central Park side of Fifth Avenue, does not know what the Hunt Memorial means—unless he stops to read—or why it is set just where it is, it may be a matter of indifference that in a year or two the presence of that monument will more than ever require an explanation, but architects will regret keenly that the march of events should have deprived the explanation of its material corroborative evidence. As Mr. H. C. Frick has acquired the full Fifth Avenue frontage between Seventieth and Seventy-first Streets, and intends to build there a dwelling for himself, it seems to follow that the Lenox Library building, Hunt's most sincere and studious achievement, the explanatory vis à vis of the memorial on the opposite side of the avenue, is shortly to disappear, to the regret of architects and all those amateurs of art who feel that each passing wave of fashion should leave its most perfect work to stand for ages, as an historical record. Perhaps the singularly short-lived vogue of the Neo-Grec style in this country was due to the fact that, apart from Hunt, there were few who understood it or could handle it: its elusive refinements were not the things to attract or be understood by those who, a few years later, were such zealous proselytes of the tenets of Romanesque architecture—as they understood it.

WE had been under the apprehension that in the deed granted by James Lenox there was a provision that, if ever the building ceased to be occupied as a library, it and the land on which it stands should revert to his heirs-at-law. But, as Mr. Frick seems to have acquired the property, we presume that if there actually was such a provision the astute lawyers have discovered some way of quieting the title. In view of the ingenuity of the courts in regulating such affairs according to the whim of the man or men who happen to be called on to deal with the question, it really seems as if there were small use in incorporating restrictions into real-estate grants or in heeding them if they happen to have been incorporated. At about the same time as the sale of the Lenox Library site, the Appellate Division ruled that the restrictions imposed on a neighboring lot, once also owned by James Lenox, now no longer have any weight. In the deed affecting this lot, at the corner of Madison Avenue and Seventy-third Street, it was covenanted that it should be used only for first-class residences and until now it has been so used. But the present owner decided to alter the dwelling-house thereon standing so as to provide stores at the street level and apartments above, and thereupon the owner of the adjacent dwelling-house sued out a restraining order, and it is this order that the Appellate Division has now dissolved. We wish some one could explain authoritatively when and under what conditions restraining covenants lose their virtue.

BUT, when it comes to matters of law, the legal profession has all the rest of the world at its mercy and does not hesitate to disregard the rights of suitors and the public, if its own pleasure and convenience are in danger of being discommoded. We regard as one of the greatest evils of modern life, one of the wrongs that cry most vehemently for righting, the unconscionable way in which the courts everywhere, in other countries as well as in this, are closed for the "long vacation," to the inconvenience of the business public and the great personal wrong done to criminals and indicted persons who are kept shut up in places of detention while lawyers and judges enjoy a prolonged recess. The result of this unjustifiable practice, which is sanctioned by custom not by common sense, is that the dockets are crowded, and when the courts reconvene there are neither judges nor court-rooms enough for the proper handling of the business that awaits them. At the present moment there is, on all sides, the most clamorous demand for more court-rooms and a new court-house in this city, and yet the court-rooms that are in existence are not fully made use of, since they are on the point of being closed for several months in order that lawyers and judges may fish, sail and loaf, indifferent to the loss their selfishness imposes on their fellow citizens or the despair they needlessly inflict upon those who, possibly innocent, must await behind locks and bars their day of trial.

ASSOCIATED with the iniquity that permits the mighty annual loss of material wealth in this country through the action of preventable fires, a loss which falls mainly on the community that permits if it does not actively encourage it, is another which concerns the entire civilized world. Even Americans understand and reprehend what are known as acts of vandalism when such acts affect the masterpieces of art of one kind or another, and are stirred with indignation when they learn that an antique statue has been mutilated, an old master cut from its frame and stolen, or an interesting or beautiful building unskilfully restored or destroyed. Yet, though they realize the criminality of such acts, they seemingly applaud and commend the equally vandalistic acts of our men of wealth who are doing what they can to transfer to this country all the works of art that, openly or secretly, find their way into the European market, only, in nine cases out of ten, to house them in combustible buildings. Underwriters can replace buildings, books, furniture and clothing, but they cannot replace the works of the dead masters of art. From this point of view, the Paca edict and our own present tariff laws deserve a high place in the roll of righteous legislation.

ONE of the last things done by Sir Benjamin Baker, who died at Pangbourne last Sunday, was, at the request of the London County Council, to examine and report upon the possibility of damage being done to St. Paul's Cathedral by and because of the construction of a low-level sewer that it was proposed to construct in such a way that it would pass at a distance of forty-five and a depth of fifty-two feet from the southwest tower of the cathedral, one of the most "sensitive" portions of the structure. Although Sir Benjamin, who as the inventor of the pneumatic shield now so much used in tunneling and caisson-building was rightly considered an expert amongst experts, reported essentially that the sewer-building would work no damage to St. Paul's, it is gratifying to learn that the London County Council has practically decided to give the sewer a slightly different course and so avoid all responsibility for any future mishap to the building. As to Sir Benjamin Baker, even if some mighty tornado shall at some time overturn the Forth of Firth bridge or the attrition of the mighty Nile eventually undermine the dam at Assouan, these two great and useful structures will have lasted long enough to give their author an enduring place in the ranks of the world's great engineers.

FEW things strike the American traveling in England for the first time as more singular than the extremely leisurely way in which the natives seem to begin their day's work, particularly those who serve in hotels, eating-places and dwelling-houses. Very likely the general habit may be traceable to the curious custom of holding the sessions of Parliament at night and the extraordinary hours kept by fashionable London "in the season." However this may be, the custom has recently given rise to a curious action for nuisance, tried in the King's Bench. The plaintiffs, the landlord and landlady of a certain hotel in Bond Street, London, asked for an injunction and damages against certain builders because they allowed their workmen, in the prosecution of repairs to adjacent premises, to begin work at the unearthly hour of half past six! As damages for the loss of the custom of guests who desired to prolong their beauty-sleep to a much later and more conventional hour, the jury awarded to the plaintiffs a verdict of seven guineas.

THE citizens of the Dominion of Canada have shown themselves at times apt disciples of and believers in the theory of protection, and have insisted on erecting barriers along our northern boundaries that good Americans find peculiarly awkward. The latest instance of their fealty to the American doctrines they have adopted is afforded by the Ontario Association of Architects, who have made a formal protest to the managers of the Manufacturers' Life Insurance Company against the selection, which these managers were said to contemplate, of a Detroit architect to design the company's new office-building at Toronto. We confess to having a good deal of sympathy for the Canadians, because of the reasons they advance; but we approve their protest more because we do not fancy the idea of American architects earning a commission across the line and then scurrying home to spend it in just the way the reprobated Chinaman or Italian now adopts as soon as he has accumulated a modest competency. As one Toronto architect pointed out, if the commission went to a native architect he would have to pay an income-tax upon it, whereas all that the government could get out of the Detroit architect would be the customs dues on one set of blue-prints.

REINFORCED CONCRETE: ITS LIMITATIONS.[1]—I.

EVER since I have had the honor of being a member of this Club, I have made it a rule, whenever I learned something new or acquired some new experience, to bring it before the Club in the shape of a paper, and so now, feeling that I have again "something to say," I enlist your patience for a short hour. Of course the subject is on reinforced-concrete; what else could a structural engineer speak about nowadays, when we are in the very high tide of this wonderful material, when wood and steel and cut stone are going out of fashion, when the engineer who is not ready and able to use, intelligently, reinforced-concrete for anything in the building line, from a fence to an office-building, from a sewer to a railroad-bridge, might as well take down his shingle and retire?

The subject before us being "Limitations of Reinforced-Concrete," it seems appropriate to begin with "Limitations of this Paper." It will not deal with the whole range of the subject, for then I should in a few hours be speaking to empty benches; no new formulas or scientific investigations will be brought forward, for under the wise laws of division of labor, we designing engineers can leave these safely in the hands of the professors and specialists; you may, or, rather you will, discover other "limitations" of this paper; but then, such as it is, offering some homely truths found in actual experience, some considerations worthy at least to be discussed by you, and also deduced from actual experience, you are asked to listen to the same.

Why is concrete reinforced? Because, the ready answer is, the reinforcement imparts to concrete the inestimable quality of resisting shear and tension, as well as compression. But there is another reason of hardly less importance: reinforcing rods, judiciously placed in the body of concrete, transform it into a monolith. Now the generally prevailing opinion is that concrete itself without reinforcement, in drying, contracts into a monolith, but this is, in most cases, at least in the shape in which we generally use the material, not the case. Unless we have to deal with concrete in the shape of a cube, or a globe or a prism of simple shape, no concrete forms into a monolith, *but into a number of monoliths*. It contracts in drying on what may be called lines of least resistance into several pieces of concrete, separated by more or less open cracks, and it is the fact that this can be prevented by embedded steel rods, properly called "shrinkage rods," in combination with the effect of the reinforcing rods used to resist tensions, that has given reinforced-concrete its high place among building materials.

Some years ago we listened in this Club to an interesting paper on continuous street-car rails in which the remarkable fact was explained that street-car rails can be made continuous without being damaged or torn apart by changes in temperature, as the friction between the surface of the sides of the rails and the pavement is sufficient to hold the rail in place. Substitute in this last sentence the embedded steel rods for the pavement and the mass of concrete for the car rail, and we have stated the principle of the shrinkage rod. It is the internal stress caused by shrinkage of so many square inches of concrete against frictional resistance of so many square inches of embedded surface of steel.

Let me give you a few illustrations of the way in which plain concrete in drying separates. The figure before you shows a small concrete pier put up around the base of a wooden trestle bent. The pier being of rectangular shape, about 20 feet long, 4 feet thick and 6 or 8 feet high, might have been expected to form a monolith, and would probably have done so if the enclosed timber had not prevented it. You notice the wide crack along the sill and the two vertical cracks along the posts. Two sets of shrinkage rods, one set horizontal to prevent the vertical cracks, and another vertical set would have prevented the mischief.

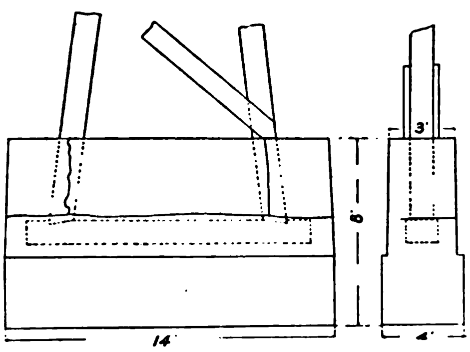

FIG. I.

Some years ago, at a time when Portland-cement concrete, without reinforcement even, was a new thing, I had occasion to extend the wings of a small highway bridge, using concrete for the extension and stepping it off, as you see in Fig. 2. The result was a pretty illustration of how such concrete, regardless of the good intentions of the engineer to form a monolith, separates into a number of them. It is hardly necessary to add that the same engineer, to-day, would not design any such graceful stepping-offs, and would probably insert some shrinkage rods.

Some of you may have had occasion to build a concrete coping with an iron railing on top of it. Now nothing is more natural, or better, than to embed the ends of the railing posts in said coping. But I can state as an absolute fact, observed not only in St. Louis but also in other cities, that of twenty such railing posts, whether they are of cast-iron or steel angles, not less than ten will crack a 12-inch or 14-inch coping, 3 feet to 4 feet wide at right angles to the line of the coping. The explanation is simple enough; being hindered by the railing posts from contracting into one continuous monolith, the coping contracts into a number of monoliths, each as long as the distance between the railing posts. The remedy suggests itself also. But in this example, insignificant as it may seem to you, we are confronted with another very important problem. If, as we have seen, 10 or 12 inches of 4-inch by 4-inch steel angle, inserted into a body of concrete of 3 to 5 square feet area, are liable to crack the concrete clear across, isn't it apparent that we should look on all embedded reinforcement as, under certain conditions and proportions, an element of weakness instead of additional strength?

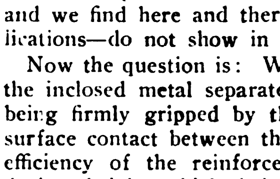

FIG. 2.

We reinforce concrete by steel rods, and we do so successfully with 0.75-inch, 1-inch, or even 2-inch rods, but what, in view of the above, is the result if we employ still larger rods, or I-beams, or steel rails, or, as is daily done in architectural work, if we use a number of small rods, close together, forming a very cluster in a narrow beam?

To illustrate this latter point I have taken at random a section of a reinforced-concrete girder from one of the technical journals and shown it in Fig. 3.

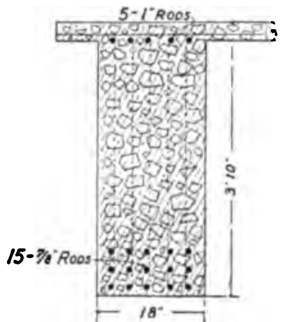

FIG. 3.

I may here remark incidentally, which will also apply to one or two other points brought out later on in this paper, that the architects are in a far more favorable position than we engineers, since they have a way of plastering, casing in, covering up, in a word, of hiding their work, which we have not. Longitudinal cracks along the reinforcing rods of their girders and beams—and we find here and there mention of such cracks in the publications—do not show in their work.

Now the question is: When have we reached the point where the inclosed metal separates and cracks the concrete instead of being firmly gripped by the same? It is not at all the mere surface contact between the two materials which constitutes the efficiency of the reinforcement, but the fact that concrete in drying shrinks, which shrinking produces its gripping effect on the reinforcement, and it is therefore all important that this shrinking should take place towards the metal, not from it.

It is still customary, although not to the same extent as in former years, to build floors of buildings and viaducts by means of concrete arches between I-beams. The centers of these small arches are generally left in position till the concrete is tolerably hard. But the mass of concrete keeps on drying and consequently shrinking, for a long time after; the concrete is generally of too great a thickness to allow of sufficient elasticity to conform to the new span, and the consequence is that a crack forms, either on one side or on both sides of the I-beams, *i.e.*, we have not an arch at all but a solid stone, concave below and resting principally on the bottom flanges of the beams. This is no mere theory. I have built hundreds of such arches in former years and hardly ever without meeting with these annoying cracks along the beams. There is a viaduct over the railroad tracks in this city whose

[1]A paper by Mr. Carl Gayler, read before the Engineers' Club of St. Louis, January 2, 1907, and published in the "Journal" of the Association of Engineering Societies.

floor consists of such concrete arches between 24-inch I-beams which carry the street-car rails. Now, if during a heavy shower you should be seeking shelter under said viaduct, as has happened to the speaker, you would be glad to have an umbrella over your head. Still, although not perfect, such arches are useful structures and generally answer the purpose very well.

This subject of the shrinking away of concrete from the steel work, instead of clinging to it, is very fascinating and worthy of the closest observation. We have been so educated into the belief that concrete and steel have, so to say, an affinity for each other, that it is not easy to get rid of that impression. Concrete, in fact, has no affinity whatever for any other material. We all know that it is next to impossible to make concrete join completely a hardened surface of concrete, or masonry, or cut stone, or any other material, *not excluding steel.* There are a number of steel plate-girder bridges in this city with concrete floors, on which a concrete wheel-guard is built up against the web of the plate girders. Surely this is a case where the embedded steel surface should appear to the naked eye as a unit with the concrete, but on a hot, sunshiny day you may notice here and there a very fine crack separating the two materials for considerable lengths.

To sum up:

(1) Concrete in hardening grips embedded steel under conditions which depend on the relative size and shape of the metal.

(2) Concrete in hardening has a tendency to separate from any adjoining surface, due to its own shrinkage. Which rules can be well illustrated, as in Fig. 4.

The above considerations apply to the whole field of reinforced-concrete work, and furnish, for instance, a strong argument against the Melan reinforced-concrete arch and in favor of the reinforced-concrete arch where steel rods or bars are so distributed over the intrados and extrados that the stresses are readily imparted to the surrounding body of concrete. This is confirmed by the experience of the Passaic River bridge in Paterson, N. J., where the arches in their downfall separated into longitudinal sections along the lies of the I-beams. The downfall, however, as you know, was caused by undermining of the foundations during an unusual high water, not through any fault of the system of the reinforced-concrete.

FIG. 4.

But there is another serious limitation to the successful use of reinforced-concrete, and this paper has been brought before you in vain, if it fails to impress you with its great importance. I refer to the question of proper inspection.

We have, all of us, inspected material, wood, iron, steel, stone, almost any building material used by mankind, but now a problem in inspection has come up such as we never before had to deal with. Assume, to make my argument clear, the case of a steel structure, either the skeleton of a building or a viaduct, and assume further that said steel structure is built without any inspection, either at the mills, or at the shop, or during erection. Now, I will not go so far as to say that the structure will be as good as if built under inspection, but it will be *nearly so.* There may be flaws in some of the plates, ragged edges to some of the shapes; there may be here and there a loose rivet; in putting the work together there may be some maltreatment of the metal; some member may after erection be slightly out of line; but after all we shall have a safe, serviceable structure, provided that the plan is correct. Let us now consider the same structure built in reinforced-concrete, on a plan equally correct with the plan for the steel work, under the same conditions, no inspection or tests of material, no supervision of the manner in which the rods are placed, more than that whether they are placed at all,—and this is no supposititious case but has to my knowledge been experienced again and again,—no control over the all-important question of continuity of operation, and the plain fact is that we shall not know what we have got at all; we have relied entirely on the honesty and efficiency of the contractor, *i.e.*, we have shirked our duty as engineers under circumstances such as we were never before confronted with. While in the case of the steel structure the possible range between a structure built under thorough inspection and under no inspection is from an excellent structure to a fairly good but at any rate safe structure, the range of reinforced-concrete work under the same conditions is all the way from an excellent structure to absolute destruction.

In confirmation of the first statement I can, from memory, quote Theodore Cooper, who some years ago expressed himself somewhat to this effect: "Every recorded case of failure of an iron bridge (leaving out of consideration accidents through derailments, washouts, etc.) can be explained through faulty design, never be attributed to poor material or workmanship." If I recollect rightly this was brought out in the discussions arising from the failure of the Tay bridge in Scotland. In confirmation of the second statement we can point to the numerous recent failures in reinforced-concrete work.

To illustrate the above-mentioned question of continuity of operation (I like illustrations, they save words and they impress):

Let G, Fig. 5, represent a heavy reinforced-concrete girder, B, the beams supported by the same. Now the best method of carrying on such work is to do it uninterruptedly, as far as possible, or, at least, to complete girder G at one time with proper recesses for the beams, and then to finish each beam B at one time.

But take the case that the work is not done on such lines, that the foreman is incompetent or careless, the contractor, as is often unavoidable, absent from the work,—what is to prevent said careless foreman from finishing girder G by itself, without recesses for the beams and to build in afterwards, perhaps after an intervening Sunday, the beams B; or supposing the work done under a glaring sunshine—and I have had cases where I felt like praying for clouds and rain—and the heavy girder G finished to half its height and then let go for a time without troubling about sprinkling,—imagine such and similar conditions, which to a greater or less extent are bound to happen, unless you are lucky enough to have an excellent foreman who relieves you of your responsibility, or unless you have the most rigid and intelligent inspection, where is the very safety, not to say excellence, of the work? The success of reinforced-concrete work lies in the inspection to a far greater degree than with any other class of building material. And the difficulty and expense of obtaining such inspection, which is generally only to be obtained in government work, municipal work not blighted by politics, or in the thorough organization of railroad work, but seldom in private undertakings or in works built in out-of-the-way localities, are in my opinion to be classed among the limitations of reinforced-concrete work.

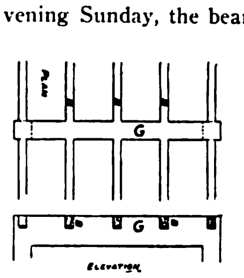

FIG. 5.

Of course, this applies with much less force to foundation work, heavy piers or abutments, etc.

(To be continued.)

WESTMINSTER CATHEDRAL.[1]—III.

HAVING now dwelt on some of the most salient features of the construction, some reference will be expected, in a paper with so comprehensive a title, to the internal decoration, intended by the architect to form an essential part of his conception, but which, unfortunately, he did not live to see carried out and scarcely commenced. When Mr. Bentley received instructions to design the Cathedral he had scarcely been out of this country, certainly not to "the land where the citron blooms." He then felt it his duty to see for himself those incrustations of marble and mosaic so charmingly described by Paul the Silentary and John Ruskin. He did not, however, cross the Adriatic nor visit Sicily. He had realized his powers, and was therefore in a position to discriminate. He took with him a small notebook, but excepting four plans of churches it came back empty. He had neither time nor inclination for mechanical toil; that would have dispelled the charm as it did eventually for Ruskin in Venice.

The Italian tour did not determine the style of the Cathedral though it confirmed it.

The first sketch plan made after the architect's return suggests in parts Sta. Sophia, Constantinople, though Mr. Bentley never saw that building; the final plan shows, as we have seen, the influence of St. Mark's tempered by an ideal he had made his own.

Mr. Bentley's suggestions for the revetment of the interior show, as might be expected, an appreciation of the principles

[1]A paper by Mr. J. A. Marshall, read before the Architectural Association, April 12, and continued from page 201, No. 1638.

had information from the newspapers and from private sources, but I have had no direct or official communication. Our ambassador at Rome and yours in London assured me that they had more than once written and requested that this direct and official communication should be sent to me. In reply to a letter written by me to Signor Tittoni, the only member of the Government with whom I had conferred in person, his Excellency wrote to me in the month of February that the question would be immediately decided by the Council of Ministers, and that I should receive a direct communication.

You know the events that followed the publication of Commendatore Boni's letter. The newspapers announced that my project had been rejected by the Government. On the 23d of February our ambassador at Rome informed me that he had received a letter from H. E. Signor Rava, in which the latter said that the decision of the Government would be sent to me. Since then, in reply to a letter addressed to H. E. Signor Tittoni, the Ministry of Foreign Affairs replied to me that the information would be immediately sent direct to me from that of Public Instruction. It is now the 7th of April, and I have yet received no official communication either of the decision passed by the Central Commission at the beginning of last November or of the rejection of my project in the month of February, while the newspapers write of the subject and discuss it repeatedly. I am receiving letters from all quarters asking me for information concerning the facts of a matter in which I am believed to be the person most immediately concerned.

This is the simple state of the case, and I must ask you and also the Minister of Public Instruction to take cognizance of it, and to act as seems to you appropriate in the interest of a question of such importance for science, for Italy, and for the world of culture.

Yours very truly,
CHARLES WALDSTEIN.

PROFESSOR CORRADO RICCI, *Director-General of Fine Arts and Antiques.*

It now only remains for me again to express the hope that the Italian authorities will speedily undertake the excavation of Herculaneum themselves, and will carry it to a successful issue, and to give utterance to my sincere gratification that under the present Government such splendid appropriations are being made for archæological research. Such efforts can but evoke joy and admiration in all those interested in archæology, in science, art and culture.

Allow me, in fine, to seize this opportunity of thanking all those, in Italy, and every part of the world, who directly or indirectly have given me help and encouragement. Above all, I should like to acknowledge publicly my debt of gratitude to my friend, Mr. Leonard Shoobridge. It was he who, in 1903, urged me actually to take in hand the international scheme, which I had developed for so many years, but did not see my way to carry into effect owing to my numerous duties. His active cooperation led to my decision. We traveled to Italy together in the spring of 1904. He prepared the way, by study, on the spot, by procuring copious illustrations and collecting the literature on the subject, and has since given me moral and actual support in the work which has demanded some energy and sacrifice.

CHARLES WALDSTEIN.

P. S.—Since the above was written, I have received a letter from Signor Corrado Ricci, to which I have sent the following reply, here given in translation:

"Propriété St. François, Gairaut, Nice,
"April 17, 1907.

"*Sir*:—I have just received your kind letter, which you tell me is *'privée et personnelle.'* I am thus debarred from publishing its contents. My letter to you was in no way personal, but purely official. I asked of you and of the Minister of Public Instruction that, at last, some direct and authentic information be given me as to the fate of my 'international project,' which has now been discussed for three years. Your letter does not provide this information, and I must again beg that this be sent to me in accordance with the promise made by the Minister of Public Instruction to our ambassador on February 23.

"Believe me yours very truly,
"CHARLES WALDSTEIN.

GALERA, A LOST CITY OF THE CAMPAGNA.

FEW visitors to Rome are aware that there is a mediæval Pompeii within fifteen miles from the Porta del Popolo, a Pompeii, too, within easy reach of a wayside station on the line of the Viterbo. So when strangers from the capital arrive at the modest inn of S. Maria di Galera the few inhabitants of that commodious village appear surprised. Every now and again some member of the German college, which owns this modern Galera, comes out to inspect the place and drives in at the archway, which still bears the arms of the great Borghese pope, Paul V. But if the new arrival be an Englishman, it is, of course, assumed that he has come to see old Galera or Galeraccia, "wretched old Galera," as the innkeeper's wife contemptuously but characteristically sums up the deserted town of the Orsini, where the great Emperor Charles V. did not disdain to dine when he was returning from his memorable journey to Rome—that journey which cost the city 200 churches and gave us the principal approach to the Capitol. As for the excellent hostess, she has lived here all her life, but has never taken the trouble to walk a mile to "Galeraccia." There is nothing to see there, she says; besides, she had heard from some daring explorer who had once been there that there were snakes in the rank grass. This piece of information was true; Galera is infested with reptiles; otherwise it would be an artist's paradise.

Here, in this bare Campagna, it would be impossible to find a finer site. Galera stands, or rather stood—for it is now all in ruins—upon a steep rock of tufa, the base of which is washed by the River Arrone on its course between the Lake of Bracciano and the sea. The stream is almost buried in overhanging bushes, and the walls of the mediæval town are scarcely visible for ivy and creepers. Not a sound is to be heard as we enter the gate, for no human being has lived here for a century, when malaria drove the last pale and gaunt peasants from their eyrie above the river to the less exuberant vegetation and purer air of St. Maria. Some of their mediæval monuments they took with their few household gods, chief among them the inscription, now in the church of the modern settlement, which records the consecration of the Church of St. Andrew by Cardinal Peter, Bishop of Porto, in the pontificate of Innocent III., and in the year of grace 1204. Occasionally they have used the old town as a quarry, but the people are few in these parts, and houses and walls are not much wanted, so that Galera has been left pretty much untouched. The arms of the Orsini still adorn the deserted town, which that great clan held for nearly five centuries; the belfry of one of the churches where they worshiped still stands, a prominent landmark from a distance; the remains of their palace are still visible, though the wild fig-trees are doing their best to tear the stones asunder. Nowhere, except down at Ninfa, in the Pontine marshes, is desolation at once so picturesque and so complete, and in both cases the cause has been the same. Yet these overgrown and almost impassable lanes have had a long and eventful history.

An anti-pope once sought refuge behind these ivy-clad ramparts, for it was here that Count Gerardo of Galera sheltered Benedict X., the nominee of the Roman nobles, from the assaults of the 300 Norman knights whom Nicholas II. and his great adviser, Hildebrand, had dispatched to the siege. The steep hillside and the stout walls proved too much for the Norman besiegers; but ere long the attack was repeated, and the count had to surrender his dangerous guest, who was sent to meditate in a monastery on the defective fortifications of Galera. Throughout the Middle Ages Galera shared the usual fate of the Campagna castles. As an Orsini stronghold it was, of course, sacked by their rivals, the Colonna; when Fortebraccio ("Strong-i'-th'-arm"), the great robber captain of the fifteenth century, descended upon Rome, Galera sent out a force of armed men to oppose him, and every important event which affected the prospects of its lords was doubtless reflected in the lives of the dwellers on this isolated rock.

Malaria has lost much of its terrors; quinine and wire-netting have made places habitable which not so long ago would have been considered as veritable fever-beds. The Isola Sacra, near Ostia, is no longer deserted in the dog-days; there is talk of turning Castel Fusano into a watering-place; the colonists from Ravenna belie the pompous inscription in the courtyard of Cardinal della Rovere's castle, which bids the stranger "seek their scattered bones in the fields" (that inscription was the work of a Socialist deputy from the Romagna). But Galera is too picturesque and too circumscribed to entice its inhabitants back; nor is the fact to be regretted, for a deserted city is always most likely to be preserved.—*Rome Correspondence of London Morning Post.*

THE FIRE-INSURANCE HABIT.

THE press has done splendid work in combatting patent medicines and other great abuses, but none of these, in my estimation, equals in sinister and far-reaching results the insurance habit into which our people have drifted or been beguiled, says Architect F. W. Fitzpatrick, in the current *Inland Architect*. Though fire insurance was primarily established as a wise and beneficent safeguard against possible accident, it has grown to be a gamble of vast proportions and most insidious ramifications.

But a few years ago the companies figured up their ratio of losses versus premiums scientifically and all that sort of thing, but paid only scant attention as to how buildings were built and how cities were managed from the viewpoint of fire prevention; to-day their engineers are among the most skilful in the country and know what constitutes good construction. But the local agents of the different companies were only interested in premiums, not in good building, and they turned heaven and earth to get their companies to accept what everyone knew was a poor risk. What was the consequence? Poorly constructed and ill-protected structures have been insured at such rates that the propagation of their species appeared to be profitable. This condition of affairs prevailed at San Francisco before the fire. A ridiculously low rate was made on buildings there, practically a ninety per cent. frame risk, because San Francisco possessed an excellent fire department. Now that San Francisco, the city of wood, fostered by the insurance companies, has been destroyed, the rates have gone up on everything new and old in that city, in addition to a general increase almost everywhere else. Yet the San Franciscans do not seem to understand that good, sound fireproof construction is the best insurance, even with their city laid in ashes and the horrible lesson of poor building printed in letters of fire before their eyes.

Are they taking steps to prevent such an occurrence in the future? Are they building their structures of steel framing, protected from rust with cement and from fire by hollow tile fireproofing? Are they cutting off story from story by enclosing elevator and stair wells, so that those conductors of fire may be closed off, and are they taking the other precautions that would render their city immune to the blight that only a year ago almost totally destroyed it? No.

Right there in that city there is a demand for 2,000,000,000 feet of lumber, something like $40,000,000 worth. What for? For more shoddy, though well-insured, construction, more fuel for the fire that follows the next earthquake.

ILLUSTRATIONS

THE MARYLAND INSTITUTE BUILDING, BALTIMORE, MD. MESSRS. PELL & CORBETT, ARCHITECTS, NEW YORK, N. Y.: FOUR PLATES.

NEWEL AND RAMP, NO. 49 WEST 46TH STREET, NEW YORK, N. Y.

ENGINEERS' CLUB, WEST 40TH STREET, NEW YORK, N. Y. MESSRS. WHITFIELD & KING, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

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NOTES AND CLIPPINGS

CONDITION OF THE ALHAMBRA DANGEROUS.—The Governor of Grenada has convened a meeting of experts and prominent citizens to consider immediate steps to preserve the Alhambra, some of the buildings of which, it is declared, are in imminent danger of collapsing. The buildings range in age from about 660 to 550 years. Some of them were damaged by fire in 1890. The condition of decay into which they have fallen has attracted a good deal of attention lately, and the Spanish Government has been criticised for its indifference to their preservation. The poor condition of the building is not due so much to its age as to the bad usage it has received at Christian hands. After Ferdinand had taken Grenada, the Alhambra was greatly defaced. The Spaniards even whitewashed it. Charles V. pulled down the greater part of the "winter palace" to make room for a palace of his own, which still stands, roofless, very much as he left it. Other changes which were not improvements were made by Philip V. In 1812, when the French occupied it as a fortress, they endeavored to restore parts of the interior, but when they evacuated it they blew up several of its towers in order to destroy the strength of its fortifications. In 1821 a violent earthquake made further inroads upon it, and it was not until 1862 that civilization had so far advanced in Spain as to make possible a true appreciation of its intestimable value. In that year Queen Isabella began the work of restoration, for which the world is in her debt, even though much still remains to be done to preserve it from decay.—*Exchange.*

THE VIRTUE IN THE POINT OF VIEW.—Nature abhors uniformity, and very often a single block of marble contains an infinite variety of color and description of veining. This is all very well where architect and client remember that they are dealing with a natural product; too often they expect a uniformity which can only be obtained by a manufacturing process, or by a slow and tedious method of selection, in which time and cost are items beyond calculation. It is true that greater knowledge is removing many difficulties, but professional opinions upon these points still widely differ. Two practical instances will serve to illustrate the point. In the one case an eminent architect was of the uniform school. Having made a selection of material from a small 4 by 3 sample, he sent the pattern to his clerk-of-the-works with instructions to compare it with every slab sent in fulfilment of the contract, in the full expectation that this would be a satisfactory method of procedure. Just as if marble were a material like cloth or cotton print produced in bulk by machinery, with the utmost precision! Naturally friction and disappointment ensued. A particular tone of color was demanded, which at the time was unobtainable from any quarry in existence. At last in despair the contractor suggested an artificial marble, and submitted a sample of the exact coloring required. It was approved, with the warning that the sample would be compared with every foot of the bulk. There was no difficulty about this, as a material can be manufactured by man with uniformity which nature absolutely refuses to give, and it is to be hoped everyone was satisfied. Quite another experience befell an over-conscientious marble-worker. In this case, his blocks, when sawn, opened out with more than ordinary variations of tone and color. He made a selection, and then ordered a further consignment from the quarry owners. It was winter; the quarries were covered with snow, and roads almost impassable. There was consequent delay, which called forth a furious complaint from the architect. To the explanation that the cause of delay was the difficulty of matching the material came a reply which is characteristic of quite another school of thought. "The reason given," so ran the message, "was no reason for the delay—only an excuse. Do you think I want the hideous uniformity which is some people's idea of beauty? Do you think to please me by doing away with nature's own charming variety?" Heaven forbid! It is not one of the least of the troubles of the worker in the ornamental stones that it is not always possible to discover the exact school of thought to which a customer belongs until the knowledge is gained by practical experience.—*Stone Trades Journal.*

RECENT ARCHÆOLOGICAL FINDS IN ITALY.—Several archæological discoveries of interest are reported from Italy. In Cattolica Eraclea, in Sicily, the foundation walls of a magnificent theatre, dating from the Classical age, have been uncovered, and extensive researches have been begun. In Ancora a number of Roman tombs have been found, containing, among other things, two beautiful silver vases, a number of urns, with ashes of cremated persons; gold earrings with smaragd stones. Signor Pellegrini, the director of the Museum at Ancora, believes these finds belong to the third pre-Christian century.—*N. Y. Evening Post.*

TO THE WINDOW-PANE VANDAL.—A window in a Surrey hostelry, says Mr. Hamp, is completely disfigured by numberless autographs of nonentities, and in the middle of the center pane, conspicuous among the maze of signatures, is the following epigram:

"Should you ever chance to see
A man's name writ on glass
Be sure he owns a diamond
And his parents own an ass."

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SOCIETIES, PERSONAL MENTION, ETC.

THERE died in Detroit last week a man of note in his community, a good citizen, an intelligent man of affairs, a multimillionaire, who, when one stops to consider the final result of his activities, can in no small degree be held indirectly responsible for a substantial portion of the enormous annual ash-heap in this country. Although the maker of varnishes has a lighter moral responsibility than his who makes parlor matches or glass lamps for kerosene, there is no gainsaying the fact that the presence of varnished or shellacked woodwork in a burning building not only facilitates the rapid spreading of the fire through the flame's instantaneous flashing over the varnished surface, but has caused a disproportionate number of deaths, as the smoke and fumes given off by burning varnish are particularly suffocating. It is fortunate for one's peace of mind in the watches of the night that ultimate responsibility for our routine daily actions is obscured by our consideration of the more pressing nature of their immediate effects. Otherwise there would be boiled less varnish—an admirable and useful article of commerce and the arts—and fewer glass lamps and parlor matches made. And so, too, would there be fewer combustible buildings erected and no high-powered automobiles built or used. The responsibility is there, however, but it, indirect and remote as it is, does not rest solely on the individual delinquent, but must be accepted and borne by the community of which he forms a part and which he serves.

THAT this is so is shown with some clearness, when one tries to get the true bearings of the recent revelations as to the character and quality of the rails lately delivered to our railroads, a matter that is one of the most interesting and important problems that to-day confront the commercial and scientific world. Looking back only a short way, we come upon the sudden and annoying freight-blockade of last year which, without warning, opened the eyes of the public to the fact that the existing transportation facilities of the country were unable to handle the country's traffic at times of abnormal activity and prosperity. As usual, the public sought relief through crude and ill-advised legislation in many places, coupled as usual with threats of confiscation and outlawry. Railroad managers thus threatened had to set about undertaking enormous amounts of double-tracking and placed orders for immense additions to their rolling-stock, all to be delivered and installed with the least possible delay. The inevitable result was the flooding of rail-mills and car-shops with orders conditioned, most of them, on delivery on or before a fixed date—if the railroads were to be spared the visitation of further public wrath and condign punishment. The impossible had been demanded by the public and something had to give way. Quality or quantity had to suffer, since it was plain that an "aroused public sentiment" would insist on having ocular demonstration that something actually was being done, and as the common man can generally measure quantity with some accuracy, it is plain that the thing that had to suffer was the quality of the manufactured output. It is at once evident that the railmakers' assertion that the recent rail-failures have been due to the increase in speed and weight of trains is unworthy of attention, for the simple reason that, between this year and last, there has not been the increase of speed and weight alleged, while the failures have come generally, we believe, in the new rails manufactured under conditions which, as a reasonable analysis of the situation shows, were established by the public itself.

THE *Scientific American* shows with great clearness and its customary simplicity what are likely to have been the technical errors that have brought about the recent disasters and have caused every railroad engineer at a recent convention to deny that he was satisfied with the quality of the rails recently delivered by the mills to his railroad. It appears to be the universal testimony that the mills are not living up to the requirements of the engineers' specifications and that the latter are accepting the output only under the indirect compulsion of the public. Three chief elements of evil enter the problem as now handled by the mills. First, as the ores low in phosphorus are nearly exhausted, the smelters have now to use higher grade ores from which the phosphorus cannot be eliminated by the Bessemer process. Secondly, the mills now roll four rails from ingots of the same size and weight that used to yield only three rails, and to do this they are using more than formerly of the upper part of the ingot, where are collected the impurities, free car-

bon, scoriæ, etc. In the third place, as an ingot chills from the outside there is always a tendency toward shrinkage away from the axis of the mass, and there is always not only a depression in the head of each ingot having the shape of an inverted cone, but the opening, or "pipe" as it is called, always diminishing in size, continues to descend into the body of the ingot as an actual visible opening or as an invisible strain almost indefinitely. The result is that, in now using more of the upper part of the ingot than formerly, the railmakers now put through the rolls some of the ingot in which this pipe actually exists, and owing to the speed of manufacture the sides of the pipe, now much elongated by rolling, are not welded together, but exist as a longitudinal flaw, as is shown by many of the rails that have lately given way. It is clear that a longitudinal flaw of this sort in a structural shape, due to this faulty method of manufacture, is of some real interest to architects.

IT is a matter for real regret that when a suitor has a case in which a real matter of principle is involved and upon which the courts have not yet passed effectively, those to whom the principle may at some time have application cannot come forward and share with the original suitor the expense of carrying the case through to the court of last resort, as the English architects tried to do two years ago in the case of Gibbon *vs.* Pease. An individual litigant must be a very determined person, or have a deeper pocket than most, to shoulder the cost and trouble of waging single-handed a battle for a general principle, so no one can feel surprise that, as we recently recorded, Messrs. Rankin, Kellogg & Crane decided to compromise their suit against the city of Newark, rather than fight it through to a final decision that might leave them not only defeated but poorer men. Nor can one be surprised that Mr. C. H. Niehaus has decided to compromise for $3,000 his suit for $125,000 against the Louisiana Purchase Exposition Company, for their unhandsome treatment of him in the matter of his equestrian statue of St. Louis. In both of these cases there was a real matter of principle involved, and it is unfortunate that the suitors could not have had general support from their respective fellow-professionals. In addition to the money damages paid him, Mr. Niehaus has extorted the concession that the statue shall be inscribed as having been erected "after the design of C. H. Niehaus," a statement which will be altogether meaningless to the general public—and to most other people as well.

IT appears to be settled, for the moment at least, that as an arbiter of taste the Commissioner of Education for the State of New York outranks the State Architect, for, in the curious matter of the design for the State Normal College at Albany, to which we referred some time ago, it has just been definitely decided that that building shall have the exterior effect designed for it by Mr. A. R. Ross, in spite of the disapproval of the State Architect. As Mr. Ross is to receive, it is computed, a commission of $8,500, one thousand dollars more than the salary paid to the State Architect, the incident will at the same time strengthen the hands of those who believe in the folly of employing State Architects—except for very circumscribed duties—and will encourage the opponents of the institution to ask with renewed insistence what wisdom there is in employing such a functionary, if some one else has to be called in to do his work.

GERMANS, at least those who, during the Boxer uprising, made off with the collection of wonderful astronomical instruments, centuries old, and installed it in Berlin, must, because of what has occurred lately, be ready to agree that the Japanese are rapidly gaining the plane of occidental civilization and so need no longer be included amongst the "yellow perils." News reached this country last week that a Japanese nobleman has succeeded in carrying off to Japan the wonderful P'ung-duk pagoda at Seoul which for three centuries at least has been a loadstar to Japanese ambition. One might expect that so wonderfully audacious and capable a people as the Japanese would have carried off this pride of Korean architecture, now nearly one thousand years old, in some unusual, if not theatrical, way, say bodily and between dusk and dawn. But no, the rape was accomplished with truly occidental vulgarity and sordidness. Finding it impossible to induce the Korean custodians of the pagoda to sell the structure to him on any terms, the determined collector of souvenirs recalled the fact that, owing to the late trouble between Japan and Russia, the affairs of the Hermit Kingdom are now administered by Japanese officials, with or without the knowledge and consent of the Emperor of Korea and his advisers. From these obsequious fellow-countrymen, who had no real power in the premises, the Viscount Tanaka easily obtained, for a consideration, probably, written permission to take down and remove the sacred shrine, and the removal was actually made quite openly, the Koreans being too intimidated to interfere.

PROBABLY the most inequitable laws on our statute-books are the lien laws, and the architect, or the lawyer for that matter, who professes to understand them is really a very audacious person. As architects know, or should know, that their client's pocket is the security that both material-men and mechanics have their eyes on, they ought always to exercise especial care to protect him from the attacks of those who are practised in the art of building without capital. A very interesting bill, and we incline to think it a very just and useful one, was reported favorably to the Michigan Legislature early last month. It is intended to prevent a contractor from slipping out of his difficulties and leaving the unfortunate material-man to fight it out with the still more unfortunate owner. Mr. Miller's bill provides that when a material-man is obliged to place a lien upon a building in order to secure payment for material used in it, then the contractor who ordered and used the material has been guilty of embezzlement and can be punished by five years' imprisonment or a fine of one thousand dollars, if intent to defraud can be proved; while if there was no such evil intent, the penalty is fixed at ninety days or one hundred dollars, or both.

REINFORCED CONCRETE: ITS LIMITATIONS.[1]—II.

LIKE the preacher, I might have subdivided, this paper into "firstly," "secondly," and so on, and the headings would then have been somewhat as follows:

(1) Generally.
(2) Inspection.
(3) Science of reinforced-concrete.
(4) Details of construction.

So that we have now reached the problem of the so-called science of reinforced-concrete and a very troublesome problem we shall find it, for we are dealing with a material whose physical qualities and even shape undergo great changes for some time after it has assumed its duties, a material the computations of which, more than that, the very definitions of whose properties, are as changing as the winds that blow.

This is a strong statement and needs explaining. I promise to be as short as possible; the question of shear and the theories of stresses in more complicated structures, as arches, retaining-walls, etc., fascinating as they are, will be hardly touched on; instead let us assume the simplest possible case and take up the computation of a reinforced-concrete girder, beam or slab composed of ingredients according to ordinary practice, at one particular time, say a few months after the concrete is laid. We have thus discarded the above-mentioned differences in the strength of the concrete at the different periods of hardening, also the question of different qualities of concrete composed of ingredients mixed in different proportions, laid with different amount of wetness, etc.

Now we are all familiar with such definitions as neutral axis, modulus-of-elasticity, factor-of-safety, ultimate strength, etc., and we meet them again in the calculations of the reinforced-concrete girder, beam or slab, but their character and meaning have changed.

While with steel beams these definitions are definite and constant, with the reinforced-concrete beams they are more or less indefinite and variable.

The modulus-of-elasticity of structural steel is constant within the elastic limit and for the different kinds varies hardly more than 5 per cent. from the generally assumed 30,000,000 lb. per sq. in., but the modulus of elasticity of reinforced-concrete is variable, decreasing under increasing pressure, and its variations in strength have been stated at ranges varying all the way from 750,000 lb. to 4,000,000 lb. per sq. in. The generally assumed value of 3,000,000 lb. per sq. in. for the modulus looks like a rather bold compromise. M. Christophe, a French authority on reinforced-concrete—and it is to the French that we owe our theories on reinforced-concrete—suggests the abolishing of the very name of modulus-of-elasticity of reinforced-concrete.

From the fact that the modulus-of-elasticity of steel is constant while that of reinforced-concrete varies, it follows that the neutral axis is variable, rising above the middle of the beam with the increase of the stresses in the beam; and it follows furthermore from the variability in the modulus-of-elasticity of reinforced-concrete, *i.e.*, the variation in the compressibility of concrete, under varying pressures, that the center of gravity of the compression stresses in the concrete varies and also that we have quite a variegated collection of stress-strain diagrams, with which, however, I will not trouble you.

All authorities agree, furthermore, that the term "factor-of-safety" is not, strictly speaking, applicable to reinforced-concrete work, because cracks open in the lower surface of the concrete before the steel is stretched beyond a safe strain and before the upper part of the concrete is compressed to its safe limit.

Yet, in spite of these uncertainties, variable factors and characteristics, the fact, absolutely proved by daily experience all over the civilized world remains that reinforced-concrete in the shape of beams and slabs, if properly proportioned and handled, is a material of inestimable value, safe, fireproof as no other material, everlasting and relatively cheap; so, theories and formulas which covered the case had to be evolved and with an astonishing amount of ingenuity and learning they have been evolved. All honor to the men who gave us these theories. It is true the first formulas looked rather formidable and it was expecting a good deal from the busy engineer that he should familiarize himself with their intricacies. But the long perplexing formulas have had their day and simple rules which appeal directly to the understanding have taken their place.

[1]A paper by Mr. Carl Gayler, read before the Engineers' Club of St. Louis, January 2, 1907, and published in the "Journal" of the Association of Engineering Societies; here continued from page 208, No. 1639.

As you all know, the moment-of-resistance of a beam, girder or slab is to-day expressed as the product of the stress in the steel reinforcement into the effective height, *i.e.,* into the height from the centre of gravity of the steel rods to the centre of gravity of the compressive stresses of the concrete, with the condition that the proportion of square inches of steel to the number of square inches of the concrete shall be at a certain ratio. In other words, the moment-of-resistance of any reinforced-concrete girder, beam or slab is strikingly similar to that of any steel girder or beam. Considering the amount of knowledge and ingenuity displayed in the theoretical researches it seems like an unkind saying, but it is true nevertheless, that we are hardly justified in speaking of a "science of reinforced-concrete" at all.

It might interest you to see just what cross sections we obtain for a reinforced-concrete girder if we apply such formulas and proportions as are the daily practice, and to compare the same with the cross sections of a steel beam and of a wooden joist of the same strength. In Fig. 6 a few such sections are shown, drawn to the same scale.

Assumed units: extreme fiber stress in I-beams..16,000 lb. per sq. in.
Extreme fiber stress in reinforcement.......... " " " " "
Ratio of areas of steel to area of concrete..........1.25 per cent.
Extreme fiber stress in wood..................1,200 lb. per sq. in.

The results are rather startling and it must be confessed that for clumsiness, unsightliness and apparent wastefulness the reinforced-concrete girder, at least in its simplest shape, is without a peer in the realm of building materials.

In using the word "wastefulness," that part of the concrete which lies below the neutral axis is referred to. It really does seem as if very little use were made of the strength of this portion of the concrete, at least in girders where the shear is taken up by steel.

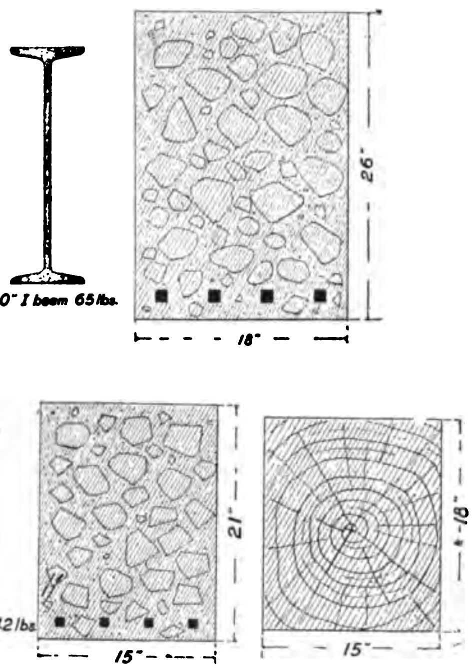

FIG 6.

In mere fairness it ought to be said, right here, that the reinforced-concrete slab, used as floor for buildings and viaducts, is, in every respect, economy, fireproofness and strength, unequaled by any other building material; but as our subject is the "limitations of reinforcd-concrete," such a eulogy does not come within its scope.

Let us take another illustration, the comparative cross sections of a column for a building in cast-iron, steel and reinforced-concrete, all of equal strength. These cross sections are particularly interesting because they are taken from actual experience.

Plans have been prepared for a five-story warehouse, using cast iron columns, steel beams and concrete floors. For weighty, financial reasons, reinforced-concrete was substituted for all the metal work and the relative cross sections of the cast-iron columns and of the substituted reinforced-concrete columns, the latter, as planned by the contractors themselves, drawn to the same scale, from the first story of said building, are shown in

Fig. 7. A section of the Z-bar column of the same strength is added.

The unit compression of the concrete was assumed at 500 lb. per sq. in., of the reinforcing rods at 7,500 lb. per sq. in. The

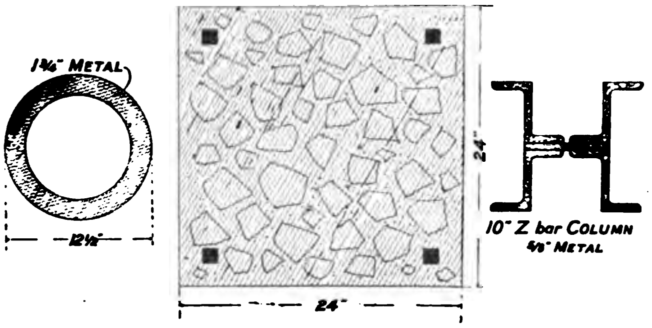

FIG. 7.

sections of the cast-iron and of the Z-bar columns were taken from Carnegie's handbook.

Allowing 400 lb. per sq. in. on the concrete, instead of 500, would require a column 27 or 28 in. square.

From this and similar examples, taken from ordinary daily practice, I am absolutely convinced that the reinforced-concrete column will never be a serious competitor of the steel columns for high buildings, unless we can produce a concrete far superior to the concrete we are using to-day. The steel column, protected by concrete against fire, will remain the best and safest column for high buildings, not only because it is safer and takes up less room but also on account of its elasticity, which enables it to resist tornadoes and earthquakes better than any other known material.

If the use of reinforced-concrete for certain parts of a structures, as we have seen in the example of columns of high buildings, or of girders where the architectural appearance is of importance, is limited through the competition of steel, so on the other hand some points can be mentioned in which reinforced-concrete is at a disadvantage compared with mason work or cut-stone work.

We will not again refer to possible cracks which may occur in spite of all precautions, expansion-joints and shrinkage-rods, but it is certain that the surface of concrete becomes unsightly through efflorescence, discolored and liable to show a number of fine, so-called hair-cracks. As this fact, however, has been ably discussed by other engineers and it is very likely that this annoying quality will be successfully eliminated through special treatments of the surface, we will not lay too much stress on it.

But there is another limitation to the use of reinforced-concrete which to my knowledge has hardly ever before been brought out—the low ultimate compressive strength of concrete.

Text-books give the ultimate compressive strength of granite as from 5,000 to 18,000 lb. per sq. in., of limestone from 4,000 to 16,000 lb. per sq. in., of sandstone from 2,500 to 10,000 lb per sq. in. Prof. Ira D. Baker gives the following list:

	lb. per sq. in.
Trap rock of N. J., ultimate crushing strength	20,000-24,000
Granite, " " "	12,000-21,000
Marble, " " "	8,000-20,000
Limestone, " " "	7,000-20,000
Sandstone " " "	5,000-15,000

As the ultimate compressive strength of the different kinds of concrete is from 2,000 to 3,500 lb. per sq. in., this material has to be classed among the soft sandstones. This point is of the utmost importance; it explains the unwieldy size of reinforced-concrete columns, also the fact that the surface of concrete has to be protected, particularly at corners, against abrasion, as, for instance, from passing vehicles, heavy floes of ice, etc., and the failure of concrete as a material for street or alley pavements without an extra wearing surface which can from time to time be renewed. There is no doubt that the low ultimate strength of concrete in compression will limit the practicable length of span of concrete arches, whether reinforced or not, and it will also be an important factor in the design of high retaining-walls, chimneys, etc.

The time is too short to enter into the question of use of reinforced-concrete for retaining-walls, but the following statement, based on the experience of many years, may be permitted:

In view of the great uncertainty as to the amount and direction of earth pressure on a retaining-wall, we should always keep in mind that, after all, a retaining-wall resists through its bulk, its mass, whether it is built of masonry or of plain concrete or of reinforced-concrete. A reinforced-concrete wall carefully designed in all its component parts, face work, buttresses, projecting sole and so on, without being ponderous enough to resist the horizontal component of the earth pressure, is like a carefully designed reinforced-concrete arch with insufficient foundations.

Taking up the question of details of construction:

Stress has been laid above on the gripping quality of the concrete on the reinforcement, which is indeed the very basis of the success of reinforced-concrete construction. Now we find it to be general practice to cover the steel rods in the bottom of a reinforced-concrete girder by concrete of a thickness of 1 in. or 1.5 in., and it is customary to consider this as sufficient covering because it is a sufficient protection for the steel in case of fire. This seems to be true; but how can we expect this thin coating to grip the steel rods up to their elastic limit, especially steel rods of an inch and more section? I am aware that this is a matter of judgment and is not covered, to my knowledge, by any theory; but from intimacy with the material it seems to me that a thickness of 3 or even 4 in. for heavy rods would be more appropriate, more particularly so in girders which are exposed to shocks. This applies not only to the beam or girder but to the reinforced-concrete arch, the reinforced-concrete retaining-wall, in fact to any structure where the concrete has to take up the stress or increments of stresses in the imbedded steel work. Let us take, as an illustration, two cases which, though not strictly parallel, are analogous enough to be compared—the anchor bolts in a pier and the steel reinforcement in the intrados of an arch. We will have the anchor bolts without a washer, because these washers have a tendency to crack the concrete, but held by the gripping effect of the concrete on its surface. Would such anchor bolts be considered effective by any engineer if placed within an inch or two of the edge of the pier, and under what argument or theory are we justified in taking a different rule for the steel rods in the intrados of an arch?

And this brings up another point in the use of such rods: the transmittance longitudinally of their stresses.

In proportioning reinforced-concrete columns for a building it is customary to include the sectional area of the steel rods placed near the corners of the column as effective against compression, and it is also customary to make such rods of the length of one story without any connection with or any bearing on the rods in the columns of the next story, *i.e.*, the tiers of columns are so built that the ends of the reinforcing rods press on concrete.

We find this point, however, fully covered in the new San Francisco building laws, as follows:

"When vertical reinforcement is used in columns, such as rods, they shall have full, perfect bearings at each joint, and such joints shall occur only at floors or other points of lateral support, and a tight fitting sleeve shall be provided at all joints of vertical reinforcing rods."

More than this, there is an excellent provision in these same laws, for the transfer of wind stress in such columns:

"In case of buildings in which allowance must be made for wind pressure, the reinforcing rods of concrete shall be connected by threading the rods and by threaded sleeve nuts, or threaded turnbuckles or methods equally effective and satisfactory to the Board of Public Works."

It is not easy to see why these or similar rules should not be applied to other reinforced-concrete structures as, for instance, high chimneys or reinforced-concrete arch bridges. Any engineer who has had to do with the placing of reinforcing rods in a concrete arch where the present practice is to transfer the tensile stresses in each line of rods by the simple process of extending the ends of the rods a few feet beyond the joints, sometimes bringing thus the projecting ends in close contact with the adjoining rods, will agree that this primitive method should be replaced by efficient, direct joints.

The reason why these last named points were included in this paper is not that they are limitations of reinforced-concrete work in themselves, for they are easily altered, but because any improvement in the same implies, necessarily, increased cost. Now in the fierce competitive struggle going on between steel work and wood work on one side and reinforced-concrete work, the tendency has been altogether too much in the direction of introducing reinforced-concrete on the claim of reduced first cost and at the expense of first-class work.

One of the most striking instances of the tendency to cheapen reinforced-concrete work is the fact that reinforced-concrete arch

bridges in our country are built either with utter disregard of the laws of expansion and contraction under changing temperatures, or by assuming variations of temperature to suit the requirements of a cheap arch. It has, for instance, been proposed, in all seriousness, to limit in designing reinforced-concrete arches, the extremes of temperature to 26 degrees above and below the temperature at which the arch is supposed to be built! To my knowledge, this is the only recorded instance in the history of civil engineering in which, instead of building the works according to the laws of nature, an attempt is made to adjust the laws of nature to the work of man.

Let reinforced-concrete work stand on its merits, not on the claim of greater cheapness alone; it can well afford it.

Darwin, somewhere, lays down the law that erroneous opinions are comparatively harmless, because they produce at once in the minds of the listeners a healthy spirit of opposition and criticism. but that it is of the utmost importance that facts are recorded correctly. Well, the facts I have stated are correct; if you think some of the deductions drawn from them are erroneous, the harm, on the quoted high authority, is not very great.

FINAL REPORT ON THE SAN FRANCISCO DISASTER.[1]—III.

DISCUSSION

EDWIN DURYEA, JR., M. AM. SOC. C. E. [by letter].—The writer wishes to call atteneion to one of the conclusions of the Committee on Fire and Earthquake Damage to Buildings which he believes to be too severe to be warranted by the facts. He recognizes that the members of this committee had more opportunities to judge of the effects of the earthquake on buildings than he had, but, notwithstanding this, he has incidentally seen a sufficient number of instances of ordinary brick buildings which were not seriously damaged by the earthquake to make the very severe conclusions of the committee as to such buildings seem to be unjustifiable.

The particular statements to which exception is taken are the following:

> The building with stone, brick or block construction, having horizontal mortar joints, does not answer the requirement (elasticity) at all. It may be stated, as one of the most obvious lessons of the earthquake, that brick walls, or walls of brick faced with stone, when without an interior frame of steel, are hopelessly inadequate. As a method of building in earthquake countries, such types are completely discredited.

And again:

> The writers simply reiterate the statement that, speaking generally, buildings of brick walls and wooden interiors cannot be built which will not be wrecked in a severe shock, it being a fault of design and not of materials or workmanship.

This conclusion is so severe that, if it were true, it would entirely exclude the safe use of ordinary brick buildings, for any purpose, on the San Francisco peninsula. It would seem that even the few instances of brick buildings which have withstood the earthquake with little or no damage would make such a conclusion unjustifiable. The writer has taken no pains to find such examples, but believes that he has seen a number of brick buildings which, while including no steel in their framework, have passed through the earthquake with very little damage. As specific instances, he would mention the brick church on the south side of Geary Street between Gough and Octavia Streets, the stone church on the southwest corner of Geary and Franklin Streets, and the brick cathedral on the northwest corner of Van Ness Avenue and O'Farrell Street. The cathedral does not appear to have been injured at all, the stone church only by the fall of its spire, and the brick church by only slight damage to its spire. The writer has no exact knowledge as to the framework construction of these churches, but, from their appearance, it is very improbable that any steel framework was used. It would seem that church buildings, with their open interiors and large roof spans, would be especially subject to injury from earthquakes.

On the morning after the earthquake, and before the fire had reached them, the writer twice passed by a number of brick warehouses on the north side of the Southern Pacific Railroad, between Fourth and Sixth Streets, and took a little time to examine them. They were of the commonest class of brick warehouse structures, neither design nor construction showing any special care, yet they had sustained relatively little damage; they also had the disadvantage of being built on extremely poor foundations, their settlement during the earthquake, with respect to the railroad right-of-way, just south of them, being about 2 feet. These warehouses were afterward entirely ruined by the fire.

It seems that, judged even by statements in the body of the report, the conclusion quoted is hardly warranted. In regard to damage to ordinary brick buildings, the committee says:

> It must be recognized that buildings of this type were general throughout the region of the shock. The damage ranged from slight cracks to complete destruction of large structures, hence no general statement covers the case. A few individual statements may be of interest. In Oakland, a concrete-block building, four stories high, was injured little, if any. At Palo Alto, two such structures, two stories high, probably not very well built, were completely wrecked, the blocks being broken and disintegrated.

After such a statement as this—that some brick buildings were but little damaged by the earthquake—and in view of the instances known specifically to the writer where ordinary brick buildings suffered but little damage, it seems that the very severe conclusion of the committee is unwarranted; and that, recognizing the influence of good or bad foundations and of good or bad design, or material, some conclusion less unfavorable to this type of building would have been more just and more nearly in agreement with the facts. It is undeniable, of course, that such buildings are far from being as resistant against earthquake shocks as buildings of Type 3; the latter, however, are frequently entirely beyond reach because of their great cost; and the writer believes that the ordinary brick building, though generally inadvisable where financial considerations will permit of a better one, has shown, by numerous instances, that it may often pass through an earthquake practically unharmed, and, therefore, should not have such unqualified condemnation as that given by the Committee on Buildings.

FRANKLIN RIFFLE, M. AM. SOC. C. E. [by letter].—The writer fully agrees with the Committee on Fire and Earthquake Damage to Buildings that both wood and steel-frame structures are admirably adapted to withstand earthquake shocks, but he is not prepared to endorse the unqualified condemnation of a type of construction which, after making due allowance for numerous instances of inadequate foundations and poor workmanship, has proved itself capable of much greater resistance to shocks than the committee apparently is willing to concede.

The process of reasoning whereby the committee arrived at its conclusions regarding brick buildings appears to be about as follows: An earthquake sets up, in a structure, a swaying motion, the tendency of which is to distort the frame; if sufficiently elastic, as is the case with wood, steel, and reinforced-concrete construction, the structure returns to its original form after distortion; if not elastic, as in the case of stone, brick, or block construction having horizontal mortar joints, the structure is ruptured or wrecked. The latter type is then summarily dismissed with the phrases "completely discredited" and "hopelessly inadequate." It is true that the committee cited a few examples of the failure of brick buildings, to give practical support to its theoretical deduction; but, leaving theory entirely out of the question, the citation of a few examples, coupled with the information that "the damage ranged from minor cracks in brickwork to the complete destruction of large buildings," does not seem to justify the following sweeping conclusions:

> * * * as one of the most obvious lessons of the earthquake, that brick walls, or walls of brick faced with stone, when without an interior frame of steel, are hopelessly inadequate. As a method of building in earthquake countries, such types are completely discredited.
>
> * * * speaking generally, buildings of brick walls and wooden interiors cannot be built which will not be wrecked in a severe shock, it being a fault of design and not of materials or workmanship.

It is the opinion of the writer that the one great lesson taught by the earthquake is not the inadequacy of any one of the well-known types of building construction, but the necessity of adhering more rigidly, in all types, to the fundamental principles of good design, good materials and good workmanship. It is safe to say that a careful investigation of all the building failures which resulted from the earthquake, would, in most cases, bring to light serious infractions of the commonly accepted rules for safe construction, which would account for much that the committee would attribute to inadequate design or type.

During the first day of the fire the writer spent several hours in the district in which brick buildings were the prevailing

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[1] A report on the San Francisco Disaster by the American Society of Civil Engineers. Published in the "Proceedings" of that Society and here continued from page 150, No. 1634.

type, and made note of the fact that most of these were in good condition before the flames gutted their wooden interiors and reduced their walls to ruins.

If the committee had included in its investigations the brick buildings in the Potrero and Mission Districts of San Francisco, which escaped the fire, it is doubtful if it would have condemned this type of construction in its otherwise excellent report. Almost without an exception these buildings either were not damaged at all, or were damaged so slightly that the cost of repairs was trivial; and this applies to some buildings which had not been constructed in the substantial manner which engineers and architects would consider essential, even under usual conditions.

A brief description of a brick warehouse in the Potrero District, which came through the earthquake almost without a crack to bear witness to the severity of the shock, will show conclusively that it is not impossible or even difficult to construct a brick building with a wooden interior "which will not be wrecked in a severe shock."

The building is on the east side of Kansas Street, between Fifteenth and Sixteenth Streets, has a frontage of 100 feet, a depth of 200 feet, and is four stories high. The site is a portion of a tract of marshy tide land, which was formely used as a dumping ground for the city's garbage. To secure a satisfactory foundation for the walls and columns, piles were driven and cut off below the water level, or about 10 feet below the level of the street. The foundation walls were built of concrete reinforced by twisted steel bars, while, above the street level, the walls were constructed of common brick with cement mortar joints. The side walls contain no openings, but both the front and rear walls are generously provided with large windows on each of the ground floors, in addition to six wide-arched doorways on the ground floor—three at each end.

The floor systems consist of wooden beams and joists supported by heavy wooden columns. A brick partition-wall divides the building into two equal parts, each 100 feet square. At the intersection of the partition-wall with the north side wall, a portion of each of the two intersecting walls was carried to a height of about 20 feet above the roof. These walls formed a support for a water-tank about 15 feet high and 12 feet in diameter, which was full of water at the time of the earthquake. Both the building and the tank withstood the shock (or series of shocks) without sustaining any damage whatever. There was nothing unusual about the methods used by the architect. The work was done by contract under the personal supervision of an inspector acting under the architect's instructions. The results obtained naturally followed the careful observance of the commonly-accepted standards of good building practice. During the past year the owner of this building has constructed two similar buildings in the same block. In the light of their experience, who will say that the owner and architect were not fully justified in adhering to a type of construction which the committee has so mercilessly condemned as being "hopelessly inadequate"?

On Rhode Island Street, less than one block from the building already described, is a two-story brick warehouse which was built, many years ago, on a foundation of solid rock. Although, for a period of several years, it has presented a somewhat dilapidated appearance from the fact that much of the mortar had disappeared from the joints, the walls were practically undisturbed by the earthquake.

On the opposite side of the street is a five-story brick building occupied by the National Ice Company. Owing to the unusual height of the stories, the building is about as high as a nine or ten story modern office-building, but it was so well constructed throughout that it suffered no damage whatever.

Two blocks farther north, on Eighth Street, is another five-story brick building which was built many years ago, and, for a long time, was used as a sugar refinery; of late years, it has been used as a syrup factory. The floors and their supporting columns are of wood construction. At the time of the earthquake the top floor was heavily loaded with tanks of syrup. The building suffered practically no damage. This is certainly a remarkable showing, taking into consideration the character of the foundation, which is reliably reported to have sunk several feet during the erection of the superstructure. The walls were well tied together by iron rods, which largely compensated for the instability of the foundation.

Going west from the Potrero through the Mission District, one may see the following brick structures, the walls of which were uninjured: The Lick School building, and the Forderer cornice works, on Sixteenth Street; the Bryant Street Power House, of the United Railroads, and its two tall chimneys; the Union Brewery and Malting Company's tall building, on Nineteenth Street; the Mission High School building on Eighteenth Street; the Spring Valley Water Company's pumping-station and its chimney on Seventeenth Street; the tall brick chimney of the brick plant on West Sixteenth Street; other structures of more or less importance could be included in this list. It is true that the number of brick buildings in this district forms an exceedingly small proportion of the total number of buildings —which are chiefly frame—but surely evidence of this character is entitled to the same consideration as that mentioned by the committee in discussing the behavior of the limited number of steel-frame buildings in the city, which were constructed with far greater care than the brick buildings just mentioned.

A brick building on Beale Street near Market, owned and occupied by a wholesale hardware company (Dunham, Carrigan & Hayden Company), was constructed upon what the architects termed a "floating" foundation, which consisted of an independent grillage of heavy timbers for each of the four walls. The floors were supported by cast-iron columns. With the exception of a few bricks which were dislodged by the shifting of the heavy cornice stones, the foundation and walls were uninjured by the earthquake, although the latter were reduced to ruins by the fire. The foundation is still intact, and will be used for another building.

The writer has not overlooked the fact that not a few brick buildings were partially—and some wholly—wrecked by the earthquake, but it is generally conceded that most of these were so flimsily constructed that their failure was plainly due to poor materials, poor workmanship, or a combination of the two.

The City Hall is a case in point. To many, its wreckage was no surprise, since it had long been regarded as a notorious example of vicious construction. The massive columns, which were a prominent feature of the building, consisted of cast-iron shells presumably filled with good concrete. The earthquake, however, developed the fact that loose sand, brickbats, and building refuse generally, had been largely substituted for concrete. The walls were constructed with an equal disregard for honesty and good practice.

In several other instances of partially wrecked brick buildings known to the writer, the cause of failure was clearly due to inadequate foundations. Two of these had been constructed on "made" ground, while another had been built partly in excavation and partly on embankment; in fact, poor foundations were responsible for many failures of buildings of this class. Had all the brick buildings of San Francisco been erected on as substantial foundations as those prepared for the steel-frame buildings mentioned by the committee, and had they been given equally rigid inspection during their construction, it is not too much to say that the percentage of failures would have been very small indeed. On the other hand, had the steel-frame buildings been erected on inadequate foundations, there would have been a large percentage of failures recorded against this type of construction.

The writer is decidedly of the opinion that a careful, unbiased inquiry into all the facts pertaining to the behavior of brick buildings at the time of the earthquake, together with the facts regarding their construction, would not only show that, to a great extent, the conclusions contained in the reports were based on insufficient evidence and erroneous deductions, but would lead to a modification, if not a complete reversal, of the committee's findings.

Emile G. Perrot, Assoc. M. Am. Soc. C. E. [by letter].—The report of the Committee on Fire and Earthquake Damage to Buildings, while very comprehensive, is lacking in some details as to the exact nature of the materials used in construction, a knowledge of which would throw more light on the subject. Some of these details, which the writer feels would be of much benefit to those interested, are the following:

Under the head of masonry walls: What was the character of the brick; how were the walls bonded; what was the composition of the mortar (lime or cement); and what was the thickness of the walls, compared with the standards of the New York or Philadelphia Building Bureaus?

Under the head of reinforced-concrete: What proportions were used in the concrete; what kind of stone was used in the aggregate; and how many inches of concrete protected the rods on the bottom and sides of beams, girders and slabs?

All these facts are of vital importance when comparing results. In most cases it is not possible to determine these details from an inspection of the work, but it might be possible to obtain records, such as specifications of the work (if they have not been burnt), which would give this information.

The committee states that the quality of the workmanship had an important bearing on the results; that at Stanford University, where brick walls were veneered with stone, "there was a separation of the ashlar facing from the brick backing," while the buildings with full stone walls were but slightly injured. This would seem to indicate a much lower standard of workmanship in the former than in the latter case, for it is certainly not a difficult matter to bond an ashlar face to a brick backing. Further, it would lead one to believe that the standard of workmanship on the Pacific Coast was not as high as in the East, especially as the buildings of Stanford University were supposed to be of the best; what then could be expected of those buildings for which the cost had to be more carefully considered?

The question is sometimes asked: What would happen to New York, if an earthquake occurred there? The writer does not think that a calamity, such as befell San Francisco, could befall any of the large Eastern cities, as the buildings are much better constructed in every respect.

Under the head of fireproofing, the committee considers solid concrete—it does not say in what proportions—at least 4 inches thick, with a mesh of reinforcement, equal to red brick set in Portland-cement mortar. It also states "that all structural parts of a building, of whatever material constructed, must be protected by another material which will be a more or less complete loss in fire," and refers to reinforced-concrete as coming under this head. The writer cannot see the force of this argument. Since it is agreed that reinforced-concrete is a good fireproofing material, why not make the integral structural part larger in the first place, and do away with the veneer or covering, as it adds nothing to the strength of the member, while an additional thickness of concrete, being homogeneous with the structural part, gives it increased strength; so that, prior to any fire, the building has a greater factor-of-safety, and, in the event of a fire, the portions of the exterior surfaces of the concrete rendered worthless can be removed, and the parts resurfaced? The writer has seen this done with concrete damaged by frost to a depth of from 2 to 4 inches.

To illustrate the point: If it were calculated that a 10 by 10-inch reinforced-concrete column would be required to support a certain floor load, and if 3 inches of concrete were added all around for fireproofing, making a 16 by 16-inch column, this column would not occupy any more floor space than a 10 by 10-inch reinforced-concrete column, fireproofed with 3 inches of metal-lath and plaster or terra-cotta, while there would be two and one-half times more concrete, and, consequently, two and one-half times more strength in the former column than in the core of the latter, as the plaster or terra-cotta veneer would add very little to the strength.

With regard to reinforced-concrete buildings offering the solution to the problem of resisting earthquake shocks, the committee seems to think that, as now designed, they are weak; this may be so, but it must not be forgotten that, in the East, very many large and important buildings have been built, and are being built, in which much thought has been given to just such points as those to which the committee would call attention.

Luther Wagoner, M. Am. Soc. C. E. [by letter].—The breaks in tall chimneys, as far as observed by the writer, were in the middle third; the smaller chimneys, upon residences, were usually broken at the roof line, many being twisted and broken through a number of courses. One chimney, upon a brick wall, 18 by 32 inches, and 7 feet above the wall, was broken through eight horizontal courses, its top being rotated about 30° from its original position. From a careful inspection, both before and after the fire, the writer believes that most of the failures were due to lack of bond, and that the addition of a very moderate compression by the use of one or more pairs of rods, reaching preferably from base to top, and provided with turnbuckles to maintain tension upon the rods, would reduce chimney accidents to a very low percentage. The same remarks apply to walls, gables and cornices.

The writer concurs with the conclusion reached by the Committee on Fire and Earthquake Damage to Buildings that, "the prime requisite of the structure is elasticity," and, for this reason, advocates the use of moderate compression by long rods, where possible, as a proper precaution in earthquake countries. Such rods could be adjusted to maintain an elastic compression upon the top courses, and would aid in checking, and possibly wholly prevent, rotation as well as overturning.

Concerning the committee's conclusions as to fire-damages, the writer draws different ones from the same premises. He watched the burning of many of the buildings supposed to be fireproof, and believes it is safe to say that little damage was done to the external trim by fires from adjoining buildings, but that the greater portion of such damage was due to flames issuing from the window and door openings of such fireproof buildings. That this is a proper conclusion is evident from the fact that the greatest damage was at such openings, and that practically no damage occurred between the openings.

The only logical inference that can be drawn from the carefully-compiled data of the committee, as far as concerns the spread of a fire or the arrest of its progress during a general conflagration, is that a solid fire-wall is required to check the flame.

All these high-class buildings had large window-areas—common glass in wooden sashes and frames—wooden floors and doors, and much wooden furniture, and had no more resistance to exterior fire than ordinary brick or wooden buildings.

The chief lesson to be learned from this is that such openings should have better protection.

The report of the Special Committee of the National Fire Protection Association, on the Baltimore fire, 1904, page 123, states:

> The general absence of protection at exposed wall openings is responsible for the spread of this conflagration more than any other cause. In fact, this condition may be safely stated to have been the cause for the spread of this fire beyond Fire Department control.

Again, page 124:

> The contents of a fire-resistive building, without proper subdivision and no adequate protection against exposing fires, are scarcely any safer as regards destruction by fire than if contained in a building of ordinary construction.

So true and generally applicable are the foregoing quotations that they deserve to be framed and hung in the office of owner, designer and architect. Indeed, all the conclusions of the above-named committee on the Baltimore fire, pages 118 to 124, could also be deduced from the San Francisco fire.

It was stated at a meeting of the Structural Association of San Francisco, that any building had about 60 per cent. of chance of fire from an exterior attack. This was said to be due to the fact that it usually had the four sides and top as exposures, as against an interior attack; but, in a general conflagration, the attack is entirely an exterior one, hence the greater necessity of proper guards for all exterior openings and roofs.

THE ALHAMBRA.

The Moors did not enjoy the completed palace for more than two centuries. After the surrender to Ferdinand and Isabella an effort was made on a wholesale scale to deprive the Alhambra of whatever was essential to its beauty, but which was supposed to be dangerous to all who looked upon the symbols and ornament. Charles V., when his turn came to reside in it, endeavored to impart a Flemish character to the halls. At a subsequent time the Alhambra was utilized as a hospital and a convict settlement. All the inmates and their hangers-on knew that they could damage the building to any extent which was profitable. Fortunately the Spaniards were afraid of the consequences of possessing Moorish spells in their houses, and curiosity-hunters were too cowardly to journey to Granada. There is some satisfaction in remembering that an Irish refugee, Richard Wall, in the eighteenth century used his power to prevent further injury.

His preservation was only temporary. The old indifference was soon tolerated. Governor after governor was allowed to do as his whims dictated, and it might be imagined that an official wreaked vengeance on the Alhambra as if it were the cause

of his exile in such quarters. Even when the French invaded Spain and the buildings were seized, it was only by chance they were not all blown up when evacuation became a necessity. French writers endeavor to excuse the misdeeds of their countrymen by ascribing them to the fatal necessities of war, but nobody outside France is convinced. According to Washington Irving, modern travelers are indebted to a couple of women who served as caretakers, and were worthy of the title, for the retention of the Moorish characteristics which the Alhambra still presents. After the women's departure the buildings were used to confine galley-slaves, and gangs of them were kept at work in loosing the tiles of the walls and throwing them over the battlements. The original wealth of the palace must have been astonishing to allow depredations during so many centuries, and justified the poets who described it by comparing it to some living being of unparalleled beauty. As one of the inscriptions stated: "Every art has gifted me with its elegance, splendor and perfection. Those who behold me take me for a female. Indeed, when the spectator has attentively admired my beauty, he will find reality to exceed the most extravagant conceptions of his fancy. He will see the full moon beam forth from the rays of my light, and its halo leave me to enter the mansions of the sky."

The visitor who now sees the Alhambra will require to exercise his imagination before he can accept the Moorish poet's words as applicable. Long years of unbridled vandalism have shown their force in all directions. After seven centuries the brickwork, where seen, is not comparable in color with that of England which may be a century or two old. Moreover, the Moorish prince, like the majority of Easterns, did not erect a residence which would amaze spectators by its external appearance: whether small or large, a mansion was intended for the owner's own delight, and he thought only of the embellishment of the interior. That principle has been observed in the Alhambra.—*The Architect.*

ILLUSTRATIONS

THE HOTEL GRAMATAN, BRONXVILLE, N. Y. MESSRS. W. A. BATES AND A. E. BARLOW, ASSOCIATE ARCHITECTS, NEW YORK, N. Y.: TWO PLATES.

THE SOUTH SHORE COUNTRY CLUB, CHICAGO, ILL. MESSRS. MARSHALL & FOX, ARCHITECTS, CHICAGO, ILL.: FIVE PLATES.

COTTAGE OF THE MISSES PARRIOTT, COLUMBUS, O. MR. F. L. PACKARD, ARCHITECT, COLUMBUS, O

Additional Illustrations in the International Edition.

TOMBS: PLATES 57-64.

NOTES AND CLIPPINGS

THE PALACE OF THE KING OF ROME.—It consoles the thrifty spirit of Frenchmen and atones for much official extravagance when they learn that the new Cour des Comptes consists of masonry which was prepared nearly a century ago. The large building, of which M. Moyaux is the architect, is erected with stones which were intended for the palace of the King of Rome, the son of Napoleon I. As the child was born in 1811 and the Empire came to an end in 1815, it seemed to be somewhat precipitate to make provision for a palace which he was not likely to use for several years. But Napoleon was desirous to convince Frenchmen of the duration of his dynasty. Accordingly a site was selected, where the Trocadéro now stands, and Percier and Fontaine were commissioned to prepare plans of the palace, which still exist. A start was made in cutting stone, but the downfall of the Emperor prevented the realization of the project.—*The Architect.*

CEMENT TELEGRAPH POLES.—Telegraph poles made of cement, with an iron rod through the centre to insure against breakage, are the latest novelties in railway and telegraphic construction. Officers of the telegraph and operating departments of the Pennsylvania lines and of the Western Union Telegraph Company the other day inspected poles made of this material in a test yard at Rochester, Penn. Manufacturing these poles will form a new industry for the Pittsburg district.—*Exchange.*

MICHIGAN VERD-ANTIQUE MARBLE.—Organized for the purpose of quarrying verd-antique marble from the beds of that mineral lying in the serpentine group six miles from the north of Ishpeming, the Michigan Marble Company has been launched by Detroit men, and will shortly file articles of incorporation with the Secretary of State. The particular deposit it is proposed to quarry was located many years ago by the late Julian M. Case, who spent a fortune in exploiting it. Only a small amount of the stone had been taken from the quarry and it had been utilized solely for exhibition purposes. There is sufficient of the marble to keep the company busy mining it for decades to come; it has been tested to a depth of 750 feet, at which point it was found of even better quality than at the surface. It is a matter of official record that the verd-antique of western Marquette County is about the finest found anywhere on earth. This mineral, which is a dolomite, is mined to a limited extent in Tennessee, and has also been found in Georgia, but practically the entire world's supply comes from Italy, where quarries have been worked for centuries and are still productive. The stone is worth from $4 to $8 per cubic foot, in finished form, and is most largely used in the interior work of costly buildings. The verd-antique of the beds north of Ishpeming is of a beautiful green shade with red and white and stripes of a still deeper green running through it. It is susceptible of a far higher degree of polish than ordinary marble. The stone is compact and can be quarried in large pieces, at comparatively small cost. Samples on exhibition at the Chicago World's Fair in 1893 attracted much attention from mineralogists because of the beauty and durability of the stone.—*Exchange.*

RECENT "FINDS" IN ITALY.—Recent excavations at Pæstum have brought to light a magnificent roadway twenty-five feet wide and flanked by sidewalks. The pavement is of large stone blocks that show deep ruts worn by the wheels of heavy chariots. A beautiful Doric temple to Neptune, a very ancient specimen of Greek art, has been uncovered for a distance of 120 feet. Also the excavations now being carried on at Palatine Hill resulted, May 8, in the discovery of the ruins of a church of the fifth century. This building was originally a private chapel used by the first Christian Emperors of Rome. After moving to Constantinople the Emperors continued to send sacred images to the chapel. The church was dedicated to St. Cesario. Two Popes—Sergius I. and Eugene III.—were elected in the building.—*Exchange.*

SERENDIPITY.—That queer old word "serendipitious" has turned up again. In a recent essay, Mr. J. F. Lucas, speaking of a prominent London journalist, says: "The eager serendipitious spirit which marks his perlustrations among topics of the day constitutes one of the permanent attractions of the English press." It might trouble most people to define off-hand the word "serendipitious" and tell its origin. "Serendipity" was coined by Horace Walpole, who applied it to his faculty of making "finds" of an artistic kind; it is "the gift of discovering by a combination of accident and sagacity something that one is not deliberately looking for." There was a prince of Serendip or Sarendip, who discovered the blindness in one eye and the poor teeth of a camel from the state of the grass which it had nibbled. Some years ago there was a "serendipity shop" in London where old books, pictures and bric-à-brac were exposed for sale.—*Boston Transcript.*

PHŒNIX PARK, DUBLIN.—Originally the Phœnix Park was seven miles in circumference, and contained 1,759 acres. Through the liberality of Lord Ardilaun and Lord Iveagh, sons of the restorer of St. Patrick's Cathedral, and the foresight of the British Government Department of Woods and Forests, the area has been considerably extended in recent years. By the purchase of pieces of land from different proprietors, it became possible to bring the River Liffey wholly within the park boundary for a distance of several miles. Although the name had been evolved from the word "Finniske," a spring of clear water, Lord Chesterfield, when Viceroy, took it upon himself to permanently identify it with the fabled bird of Arabia, that after living single for 500 years, is consumed by fire and rises again from its own ashes. Lord Chesterfield accomplished his purpose by setting up in view of the Vice-Regal Lodge, a fluted Corinthian pillar of dignified height, from the top of which a phœnix is represented in the act of rising from the flames.—*Exchange.*

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SOCIETIES, PERSONAL MENTION, ETC.

A STRICT interpretation of the wording of the law that has just been passed establishing for cities of the first class in Pennsylvania—Philadelphia being the only such city at present—an "art jury" seems to make it possible that henceforward the designs for all churches in such cities must have the approval of its Art Jury before they can be carried into execution. The law, after declaring that the Art Jury shall consist of a painter, sculptor, architect, member of a park commission and four other persons not practising any of the arts but, at the time of their appointment, being members of the teaching or governing staff of a school of art or architecture,—all to be appointed by the Mayor,—declares that no work of art shall be bought, accepted, or created by the city save with the approval of its Art Jury as to matter, manner and site, and closes with a definition of a "work of art," as understood by the framers of the law. It appears that the term includes "all paintings, mural decorations, inscriptions, stained glass, statues, reliefs or other sculptures, monuments, fountains, arches or other structure intended for ornament or commemoration." There will be no great harm done, if it should prove that the closing general clause should be found to cover church fabrics which certainly are structures intended for ornament or commemoration, since they are "erected to the glory of God and in memory of His Son, Jesus Christ," and so satisfy the definition as stated in the law.

PERHAPS neighboring ecclesiastical authorities have had a subconsciousness of this possibility, and have thought it worth while to cast an anchor to windward, lest they might lose a power before they had actually laid claim to it, for, as will be discovered by reference to another column, the Diocesan convention recently held in Newark, N. J., adopted for that Diocese a "Canon on Church Architecture" which is much to be commended. Clergymen in this country have not given as much time and thought to the study of ecclesiastical architecture as is very commonly given to the subject by the clergy of other countries, where in many cases, to be sure, they become nothing more than arrogant controversialists who mistake the letter of the law for its spirit, and, so, are rather stumbling-blocks than aids to professional architects. But this need not be so, and if New Jersey clergymen will, at the outset at least, but take advantage of the criticism of competent architectural advisers they can do much to prevent the erection of the offensively illiterate buildings that jar so on one's Sunday mood.

EXPOSITION follows World's Fair in this country with such truly American wastefulness and uselessness that it is more than usually refreshing to hear of one such undertaking that has an ultimate aim other than the mere putting of dollars into the promoters' purses. Before the country is assured that it is not to be radically disgraced by the Jamestown Exposition, there is already a movement to hold in New Orleans a "Bi-Oceanic Exposition" which shall signalize the completion of the Panama Canal, to which New Orleans is the nearest American seaport. We do not know whether Mr. Frank Cullom is the originator of the exposition scheme in question, but he has at least come forward with what seems a possibly practicable scheme which will lead to the undertaking's being a permanent benefit to the city where it may be held, instead of a temporary, if not permanent, curse. Mr. Cullom, who is said to have made sufficiently careful surveys and computations, suggests that, with the permission of the National Government, the exposition shall be built on a site to be reclaimed, by draining and filling, from Lake Pontchartrain, between Spanish Fort and Milneburg. The site to be reclaimed is to be enclosed by sea-walls of reinforced-concrete twelve feet high and resting on piles, and the enclosed area is to be drained and filled until there is provided a building area of 320 acres, a space which is equivalent to 114 city squares. Mr. Cullom's figures show that, done in the way he proposes, the cost would be under half a million dollars—an absurdly low figure, seemingly—while the 2,280 building lots into which the site can be cut up after removal of the exposition buildings, if sold for only $250 apiece, will produce for the city $570,000—again, as local real-estate men express themselves, an absurdly low estimate. The final outcome might be a much-needed "select" suburb for New Orleans. The suggestion seems practicable, and the mere fact that a permanent good is aimed at makes it uncommonly interesting. In view of the wonderful things that

have been done in Holland and in our own country, at Galveston, Mr. Cullom's suggestion should not be turned down without careful examination.

CONSIDERING the size of this country and the cost in time and money that traveling entails, and the further fact that architectural draughtsmen own but the shallowest of purses, it is a rather remarkable fact that the Architectural League of America has been able to maintain itself for, now, a good many years. That it has been able to do so is testimony not only to the need there was that such service as it gives should be given by someone, but implies that there must have been done by promoters and officials a great deal of unselfish work. But, in a degree, it is a loose organization, and the clubs that are farthest away from the centre of activities are at such a disadvantage that one cannot feel surprise at learning that the Twin City Architectural Club, of Minneapolis, is seriously considering the desirability of withdrawing from membership in the League. As there are other clubs almost as disadvantageously located, the example of withdrawal, once set, may have imitators.

AS we thought might be the case, the news that the city of Newark had found it advisable to pay one of the competitors because its officials had not seen fit to observe the terms of the published invitations to furnish designs for the Manual Training High School has induced another competitor to enter suit, in the hope of achieving a similarly happy outcome of the affair and income for themselves. It is Messrs. Seymour and Paul A. Davis who have brought suit against the city in the sum of ten thousand dollars. As the city is more likely to fight them to compromise again, it may prove unfortunate for the new suitors that they have not secured the aid of the other competitors, so that the matter might be fought to a final decision.

A CURIOSITY of administration has just come to light in New York which, as it serves to emphasize the public's own responsibility to itself and its constituent units, we rather like, though the newspapers are trying to make use of the facts in support of allegations of wrong and misdoing. It seems that when, owing to natural decay or to accident, a structure becomes dangerous to the public, it is the duty of the authorities to serve notice on the owner that he must make the said structure safe within a fixed time. If he does so, well and good. But often he cannot or does not choose to do so, and in such case the Superintendent of Buildings has to obtain a "precept" from a court and, that secured, can then have the safeguarding work done at the expense of the owner, the cost being collectable by legal process. But it often happens that for one reason or another a precept cannot be secured at once, while it is really needful, for the sake of public safety—say in the case of a building wrecked by fire—that the safeguarding work should be done without delay. In such cases it has been the custom to apply for the precept but, without awaiting its granting, to proceed at once with the demolition or repair, and it appears that for any work done before the issuance of the precept the owner is not liable; in other words, the city pays for that part of the work done before the court issues its precept, while the owner pays for that which is done afterwards. It is because this emergency work seems to have been done by favored contractors that a suspicion has been aroused that the Superintendent of Buildings may not be quite as prompt as he should in applying for the legalizing rule.

ALTHOUGH we feel that the champions of reinforced-concrete lack good judgment in claiming for a useful the virtues of a fireproof material, we agree heartily that indirectly, at least, the material and method in which it is involved may be of much service in preventing fires and the entailed losses. To rats and mice concrete walls and floors present impenetrable barriers, and if the material should only prevent fires that are now caused by these semi-domestic vermin the extra cost of its use would be justified. In all the tabulations of fire-losses prepared by underwriters there is to be found a column headed "rats and matches," where are charged fire-losses that possibly, or probably, have been caused by the adjacency of these agencies. Moreover, of late years, a new heading, "defective wiring," is also found in these tabulations, with a steadily growing total loss as a footing, and strangely enough the pestiferous rodent has a responsibility here as well. The Biological Survey of the Department of Agriculture has just issued a very interesting *Bulletin* on rats and mice, their habits, rate of increase, diseases, and so on, a most interesting but repulsive document. Architects, of course, knew that rats injured woodwork, stored matches in their nests as choice tid-bits for midnight suppers, and gnawed through lead vent-pipes or water-pipes when they were thirsty; but we do not believe that many knew that the pests were particularly fond of some forms of the insulating covering of electric wires, and that this fondness, though the short-circuiting may have been fatal to them, often caused the destruction or injury of the building affected. It is said that a considerable part of the fifteen millions of annual loss in this country now charged to "defective insulation" should actually be charged to rats and mice.

IT is a very interesting piece of news that another painter, and a very capable one, is to try his hand at sculpture, and we fancy that, if those who follow the exhibitions should be asked to guess the name of the new recruit, a fair majority would settle on the name of Kenyon Cox, so markedly sculpturesque in conception, pose, drawing and modelling are most of this artist's figure paintings. Mr. Cox it is who has been asked to submit a model in competition with certain New York sculptors proper who eventually are to be charged with that class of work for the Brooklyn Institute. Messrs. McKim, Mead & White have put the oversight of the sculptural decoration of the building in the hands of Mr. D. C. French, and he has persuaded Mr. Cox, who has never modelled before, to translate into the round some of the conceptions he puts on canvas with such anatomical accuracy and artistic grace.

THE EMANCIPATION OF ARCHITECTURE IN BELGIUM.

IN coming from England, we enter Brussels by the Gare du Nord, and crossing the square we start to walk to the centre of the city by that busy street, the Rue du Nord. We have walked barely a block when we find our attention riveted on a large structure all of glass and iron, unmistakably a department-store.

The name could not have been better chosen. It is called "L'Innovation."

Happy in its proportions, graceful in its details, it stands out a refreshing oasis in a desert of commonplaceness.

With an inherent prejudice against the new, we start, unconsciously perhaps, to criticise it, but, admitting the feasibility of the use of exposed structural iron in a country where the universality of fireproof construction nearly eliminates the possibility of a conflagration, we are forced to allow that the building eminently answers the purpose for which it was intended.

Further, on examination of the details, we find that what at first seemed a somewhat riotous use of the materials contains, to an impartial and unprejudiced judgment, nothing but what is perfectly possible and reasonable.

When we enter, we are immediately struck by the openness and the brightness of even the remotest corner, and yet the building receives light only from the skylight and a comparatively narrow street façade. Why this brightness? Examination reveals the fact that the freedom in the design of the structural iron and glass admits of an original disposition whereby light may easily penetrate everywhere, a disposition which, with the classic use of such materials, would be well-nigh impossible. We are struck, too, with the lightness and the grace of the ironwork, a lightness quite at variance with the customary use of the material. Continuing up the Rue du Nord, a few minutes' walk brings us to another structure, on the Place du Theatre de la Monnaie, again a department-store and again quite radically different from anything we have seen before. This building is in stone, iron being used only where lightness directly demands it. Yet, approaching this in the same critical spirit as we did the other, we are forced to admit that it is all feasible, in consideration of the exigencies of the structure and the properties of the materials.

NO. 66 RUE DE L'HÔTEL DES MONNAIES. HORTA, ARCHITECT.

We cross the center of the city and climb the Rue Lebeau, and here two buildings stand out markedly from their neighbors by the freshness and originality of their treatment. We turn down to the right from the Place du Grand Sablon and find ourselves opposite a large building in iron, brick and glass, part store, part club, part bank, part hall—all similar in treatment to the buildings we have recently seen.

We leave the city and pass out into the modern suburb between the Chausée du Charleroi and the magnificent Avenue Louise. We wander at random through a maze of irregularly intersecting streets, past miles of houses separated from each other only by party-walls; houses all gaudy in color, vying with each other in the use of brilliant enameled and glazed bricks and tiles, sgraffito and paint; a riot of color which, as a rule, is most inharmonious and which soon becomes repulsive from its lack of repose.

But it is not all thus.

The eyes, soon tired by this constantly changing kaleidoscope, frantically search for relief. And soon, far down the street, they find it in a building which by its saneness and its harmoniousness instantly attracts. We approach, to find ourselves before a house marked by the same originality of treatment that has so struck our attention in the town.

We continue to wander at random, only to find the quarter liberally besprinkled with products of a similar nature.

We begin to realize that there is a spirit—a genius—abroad, peculiar to the city. Before searching out the genius itself, let us try to analyze the life and conditions in Belgium which would lead to the emancipation of architecture here sooner than elsewhere.

NO. 459 AVE. LOUISE, BRUSSELS. HORTA, ARCHITECT.

We return to the heart of the city and enter a large café. Every seat is taken. By whom? By good bourgeois families, the father, mother and the children, good, honest people, self-respecting, who, tired with a day's hard labor, come here not to drink, but for the sociability and cheerfulness that they do not find at home. We listen to their conversation. We probably do not understand them, yet we catch now and then words which are distinctly German, or others which sound like English. They are talking Flemish. We ask one of them a question in French. He replies in French, as though it were his native tongue, and with a vivacity and brightening of the eye quite in contrast with the Teutonic stolidity of his attitude a moment before.

We walk through the streets; the signs are usually in French. We enter a store; business is conducted in French. We wan-

"L'INNOVATION," BRUSSELS. HORTA, ARCHITECT.

der through the residential parts of the town. The plans and character of the houses denote an Anglo-Saxon rather than a

MAISON DU PEUPLE, BRUSSELS. HORTA, ARCHITECT.

French family life. Thus from these and other observations we are led to believe that the intimate or family life is rather English or German in character, while the external or less intimate relations are mainly French in their characteristics.

The juxtaposition in the same individual of Anglo-Saxon stolidness and Gallic keenness and vivacity characterizes a people unwilling to be bound by the traditions of either, but most receptive of whatsoever may express most fittingly their own peculiar temperament.

The country, too, is most fortunate in not being bound by any strong architectural traditions.

The only strongly indigenous architecture of the country is that charming, picturesque style that we see in buildings which survive from the Middle Ages. Yet, however beautiful that may be in itself, it is not applicable to modern life or materials.

Again, Belgium is most fortunate in not being dominated by an all-powerful school or academy of architecture which stifles any effort to break away from its thralldom. It is this which in France has tended more than any other one thing to retard a general attempt to treat architecture there freely. Blind conservatism is, in general, in Belgium a comparatively negligible quantity. The natural result of this progressiveness, receptivity and searching for individual expression on the part of the Belgian, combined with the small hold of the mediæval architecture, the lack of a dictatorial school and, in general, the absence of an uncharitable conservatism, is, naturally enough, a

GRAND BAZAR ANSPACH, BRUSSELS. HORTA, ARCHITECT.

spontaneous outbreak of a treatment different from any to be found in precedent, yet eminently adapted to the materials and to modern needs.

Why such an outbreak occurred at just such a time and no other is much more difficult to decide, yet an outbreak did occur between 1890 and 1895. The immediate effect was to create a cult with a body of enthusiastic admirers of the new work.

Many architects took up the style as laid out by the masters.

But it was their very zeal which was largely responsible for the untimely collapse of the movement, for most of the architects who took up the new work being utterly unprepared and even unable to solve successfully the problems for which there was absolutely no direct precedent, exaggerated its faults to such an extent that the public turned against it, so that to-day very little new work is built along distinctly modern lines. Through all this sequence of events there stands out clear and bold one personality—Horta's. He is, as far as we could find out, the real father of the new movement. He is the one man whose judgment and taste are so keenly sensitive, even along abstract lines, that they seldom permit him to commit a radical error. Rarely has he allowed himself to be led astray,

rarely has he done anything for which he did not have a valid reason, and this despite an exaggerated artistic temperament. His first work of importance was the house at 12 Rue de Turin, built in 1895. As we see from the photograph, this is symmetrical in arrangement, the entrance door being flanked by smaller windows. Next above comes a low entresol and then the main story with a chamber story above. The whole is in a light limestone of two tones.

The ironwork is painted a gray green, with parts picked out in gilt: The wood is left natural color. The chief interest of the design is the central bay, its graceful springing from the head of the door and its development through the entresol and the main floors. Of especial interest is the subtile joining of the iron and the stone.

The house at 37 Rue Lebeau, while in detail not as interesting as some of the others, still deserves notice for the attempt to combine a shop in the ground floor with a home above.

The house at 66 Rue de l'Hôtel des Monnaies, of which we show a detail photograph, was built in 1898. It is of a light gray limestone and a brick of similar color. Certain trimmings are of a light blue-gray slate. The ironwork is painted a gray, similar to the brick. The woodwork is natural oak.

M. Horta's limestone at 25 Rue Américaine is, again, in a light buff-gray limestone with ironwork of gray-green. The part on the right with the large windows serves as an office and atelier, that on the left as a residence. Especially worthy of note in this case are the large iron brackets under the stone bay-window with the rods by which is suspended the balcony over the front door, Particularly graceful in their study are the points of attachment of the rods.

Next in order come four houses on the Avenue Louise, the upper Fifth Avenue of Brussels. One, at 224 Avenue Louise, is symmetrical, consisting of a wide façade with a bay-window at either end. A balcony at the first floor level connects these bay-windows.

The white limestone house at 346 Avenue Louise charms by its very simplicity and dignity. The large carriage-entrance at one side leads through to the back. The three windows of the second floor with the connecting iron balcony show what effect can be gained by a conscientious study of proportion and the elimination of all superfluous detail.

A house at 459 Avenue Louise, similar in style, but less dignified in some of its structural members, attracts our attention by the third-story loggia with its background of Pompeian red marked with narrow bands of gold, against which the plate-glass wind-breaks with their frames of gilded wrought-iron stand out in pleasing relief.

The Maison du Peuple, or People's Palace, constructed in 1900, was Horta's first large work. There is something peculiarly appropriate in the application of a free modern architectural treatment like this to a building for a popular socialistic organization. Four materials are used: limestone, red brick, buff-painted iron and natural yellow woodwork combined in the simplest manner possible. The interior contains many charming little details, in the café, in the main staircase and in the large assembly-hall at the top of the building.

But of perhaps greater interest is the big department-store that we noticed first on entering the town. This was built in 1904 by M. Horta. It is very deep, extending through to the street behind, but with an entrance only on the Rue du Nord. The interior is lighted entirely from the front street and from overhead. An ingenious arrangement allows for lighting near the party-walls on the ground floor by letting the light from the skylight pass in behind the mezzanine floor. The lightness and grace of the wrought ironwork in this building denote a most conscientious study of every detail. The iron is uniformly painted a light buff color. The relation of the electric light brackets and the signs with the general architectural treatment should be noted in passing.

The façade on the Rue de l'Évêque of the Grand Bazar Anspach was built in 1906. It is in buff limestone with buff-colored ironwork. Most radical are the girders over the plate-glass front of the ground floor.

Such is the work of M. Horta, the genius of the modern movement in Brussels. His strong personality is easily felt in everyone of his works. Little wonder that he had a crowd of imitators.

Another man, who is often classed with Horta, in Hankar, who died in 1900. The character of his work, however, is so radically different from that of Horta's that it is impossible to confound the two.

One of the earliest and best of his works is the group of three houses, 76 to 80 Rue du la Croix de Pierre in the suburb of St. Gilles. Built very simply, of red brick with a base and a few spots of stone, a panel of sgraffito and a simple iron balcony rail, they have a charm that few of his later works excel.

His combined house and store on the Rue Lebeau is interesting in comparison with the similar problem treated by M. Horta just across the way.

Hankar's house on the Rue Defacqz, of which we show a photograph, dates from 1897. It is built of a buff limestone, a buff-gray brick and the rest of sgraffito of a general old-gold tone, with a play of reds, yellows and greens quite in harmony with the rest of the building. The iron is painted a gray-green. The woodwork is left natural color.

We show another photograph of a house built at 385 Avenue Louise. The brick is a light gray, the trimmings are of a bluish-gray stone, the panels above the main windows are in red and white sgraffito, the cornice panels are in blue and yellow sgraffito, the iron is painted red, the basement filling is of brown rubble. Its attractiveness is due to its simplicity.

NO. 80 RUE DE LA CROIX DE PIERRE, BRUSSELS. HANKAR, ARCHITECT.

A difference between the work of Horta and that of Hankar can be distinguished at a glance, for the latter has none of the striking originality of the former. Hankar's departure from precedent is practically confined to his treatment of iron, and even there he does not begin to approach the freedom of Horta.

Of the other men who have worked along similar lines, Sneyers, Govaerts, Saintenoy and Hobé, their work rarely rises to the level of that of the two first named. Hobé has done some good work along lines similar to that of Hankar. Jasper at Liège, Van Asperen at Antwerp, and Van de Voorde at Ghent have done some work which we hope to illustrate in a later article. In passing we show a photograph of a motive of a house on the Rue Crayer, by an unknown architect.

Such, in general, is the work that Belgium offers to our attention; attention merited by the very originality of its treatment. This movement, which started in Brussels, soon spread all over Belgium and beyond. Certain architects from Paris and Nancy impressed by this work of Horta's in Brussels immediately started along similar lines in their respective cities.

What the future will be in Belgium it is hard to say, though the prospects seem good for the renewal of the public demand for modern work.

But of chief importance is the fact that an impartial examination of this work will of necessity set the architect to thinking. It will set him to reasoning as to whether he is really using his materials logically or not. If he is candid with himself he will ask whether he is really extracting from the stone and iron which he is using all that is possible to the materials.

HOUSE, RUE CRAYER, BRUSSELS.

GEORGE B. FORD.

SIR BENJAMIN BAKER.

WHILE the world and his bridge over the Firth of Forth remain, Sir Benjamin Baker will be the best advertised man in the United Kingdom. His work, bulking large in the eyes of common folk who marvel at its mere bigness, will also command the respect of those more penetrating, who see in it a triumph over engineering difficulties of no mean order. And yet Sir Benjamin Baker was not a pioneer; his were not flashes of inspiration which illumined dark places. He took up the work of engineering at a time when much of the experimental breaking-ground had been done, when steel construction had begun to make possible all manner of startling things. He was a builder on other men's foundations. He says himself, "The merit of the design" [of the Forth Bridge] will be found, not in the novelty of the principles underlying it, but in the resolute application of well-tested mechanical laws and experimental results to this somewhat difficult problem offered by the construction of so large a bridge across so exposed an estuary as the Firth of Forth." A careful man, a patient man, a solid man, a man capable of conceiving large things and putting them through monumentally—this was Sir Benjamin Baker. In a very English way he was great; but not, if you please, a touch-and-go genius.

Having relieved our minds of so much heresy, let us proceed to give Sir Benjamin his due.

The great engineer, just deceased, had a warm introduction to his lifework, for his training began in one of the oldest iron-works in South Wales. In foundry and forge he got intimately acquainted with the properties of the materials out of which he was to build his vast reputation. As apprentice to Mr. H. H. Price, a civil engineer, he learned the drafting of machinery of all sorts. For three years young Baker—he was only the son of one Benjamin Baker of County Carlow—sweated in the forge or mulled over designs in the office of his master. Then he got himself trained in surveying, levelling and designing works in masonry and brick. Then he graduated into the office of Sir John Fowler, in conjunction with whom he afterwards undertook the Forth Bridge.

Sir John Fowler was the unhappy man to whom it fell to burrow in the bowels of London for the Metropolitan Railway. Subways were no commonplace in 1860. Londoners in general were sure that such meddling with the eternal foundations of things would never be blessed. Engineers of reputation assured Sir John Fowler that he could never build the Underground Railway, that if he made it he could not operate it, and that if it worked nobody would travel by it. Even when it was done so great a man as Palmerston declined to open it, saying with a laugh, "I intend to keep above ground as long as I can."

In all the worries with the Underground young Benjamin Baker had his part, an ever more responsible one as his chief inducted him into the mysteries of tunneling. It was very anxious work. Problems that would not cost a modern contractor a thought weighed upon these engineering moles till they were gray. Horrible fears of pulling London down about their ears caused them to use the most extraordinary precautions, and when all was done to add yet more precautions. In their terror they used more shorings to hold up Edgeware Road Station than would now be thought necessary for St. Paul's. Says a writer in *Engineering*: "It was not then known how to undermine walls and if necessary carry the railway under houses and within a few inches of kitchen floors without pulling anything down, how to drive tunnels, to divert sewers over and under the railway, to keep up gas and water mains, and maintain road traffic while the railway was tunneling underneath."

Half the railways round about London and many a great road beside were planned and executed from the office when Benjamin Baker was a trusted second in command. The young man had made an exhaustive study of iron and steel under strains, and had written a volume upon "*Long-span Bridges*," which was printed in half the languages of the civilized world, before the question of the Forth Bridge came up.

Truth to tell, he was full forty years old when he and Sir John Fowler were intrusted with that herculean task.

Like the Metropolitan, the Forth Bridge contract was accompanied with vast anxieties. The English mind is slow to accept great enterprises. The attitude of the whole island was one of waiting for the chance to say, "Aha! Aha! I told you so!" Unfortunately there was ground for suspicion. The great Tay Bridge at Dundee had just gone down in a storm, carrying with it a railway train loaded with people. Moreover, the Firth of Forth was so deep that no sort of "falsework" or underpinning could be attempted, while no precedent existed for a cantilever of such phenomenal length. Up to within two years of its completion, the bridge was looked upon as a "*folly monument*" on a colossal scale.

To say that Baker designed the Forth Bridge is to ignore the senior member of the firm, with whose approval all plans were submitted. But a bridge designed is only shadowed forth. A thousand problems are forever springing up for solution. The Forth Bridge was not built in sections and set up; the whole work, all except the rolling of the steel plates, was done in workshops on the spot. Mr. Baker was on the ground early and late during the whole seven years of construction, directing, advising, working out problems as they appeared. He won his right to be considered the designer of Forth Bridge.

It happens that the site of the great bridge is precisely the site of the kidnapping of Stevenson's David Balfour. "The Firth of Forth (as is very well known)," says David, "narrows at this point, which makes a convenient ferry going north and turns the upper reach into a land-locked haven for all manner of ships. Right in the midst of the narrows lies an island with some ruins. On the south shore, backed against a pretty garden of holly trees and hawthorns, I could see the building which they call the Hawes Inn."

That island, Inch Garvie, and that same "Hawes Inn" have since played prominent parts in the romance of the Forth Bridge. But for the island, which allows of a middle pier between the distant shores, no highway could have been made to bestride the deep Firth waters. And but for that inn, as Sir Benjamin Baker himself points out, many a pretty fellow would have been alive to-day who was sacrificed in the risky work. Hawes Inn whiskey was at the bottom of half the tale of accidents which helped to make memorable the bridging of the Forth.

Little credit belongs to the designers for the adoption of the

cantilever principle; they were driven to it. If so wide a space over such deep water was to be bridged at all it must be by building out "by overhang." The cantilever was the only form strong enough to bear the combined stress of wind-pressure in the stormy estuary, of heavy rolling-stock, with such wide spans built without temporary support.

Somehow an impression got about that the cantilever principle was an innovation. The designers were at pains to point out the cantilever had a longer and more respectable ancestry than the arch. Said Lord Napier to Mr. Baker, "I suppose you touch your hat to the Chinese?" and the engineer replied that he was inclined to go farther back, believing that the bracket principle was originated pretty near the Garden of Eden.

Just how big is the bridge, anyway? It doesn't look big enough to make such a fuss about. I well remember when I first saw it, fancying I'd like to measure it up beside the Brooklyn Bridge. The trouble—spectacularly speaking—with the Forth Bridge is that there is nothing to compare it with. Each of the three spans is one hundred feet longer than the Brooklyn Bridge. Each of its mighty strides takes in 1,700 feet. The Eiffel Tower could be comfortably accommodated, lengthwise, on one of the trio of spans. The rails are level with the top of Albert Hall, and the tip of the towers reaches as high as the cross on St. Paul's.

When the present King, then Prince, opened the bridge in 1890, he was pleased to present to the crowd a few figures such as these: The extreme length, including approaches, is a mile and a fifth; the cantilever part about a mile. The extreme height above the bottom of deepest foundation is 452 feet. The clear headway of bridge above high water is 150 feet. Paint to the amount of 135 acres' area is required to keep it presentable. Eight million rivets were used up in putting it together, and 42 miles of steel plate went into the bent tubes on it. The steel in it weighs 51,000 tons, and the whole thing cost close upon $16,000,000. There, surely the most greedy lover of big figures must be satisfied!

American engineers have been unkind enough to suggest that perhaps Forth Bridge errs upon the side of over-security. Says Frank Skinner, editor of the *Engineering Record,* "It is characteristically English, massive in design, ponderous in the very methods of construction and erection. In this country the largest cantilevers have been built of struts and ties and beams manufactured at the shops and rapidly fitted together with single large bolts or pins, but in Forth Bridge the principal members of the trusses were enormous steel tubes made of thick plates, curved, fitted, and riveted into place. In comparison with it the American cantilevers over the Niagara, the Hudson, and the Missouri, lofty, slender structures, look like etchings on ground glass." It is certainly doubtful whether, had we possessed a Firth of Forth to bridge, we should have used up seven years in doing it. Says Mr. Skinner, again: "In building the Mississippi Bridge at Cairo, Ill., a two million pound span, 518 feet long, was run out in six days. Probably no European span of equal length was ever assembled in tenfold this time."

The firm of Fowler & Baker got titles out of their achievement, and Sir Benjamin extracted as much fun as glory and anxiety out of the experience. Some curious things happened during those seven years. When the caissons were sunk for the piers and compressed air was forced into the chambers beneath them, jets of it were continually escaping under the cutting edge and rising with furious ebullition through the water. Now the canny salmon of the Firth, beholding the mighty foaming, argued a cataract. The cataract, to be sure, was upside down, but to their fishy minds it was none the less a cataract and should be leaped. They forced their way down the column of escaping air and turned up, staring, to startle the workmen in the hot, electric-lighted chamber. There is doubtless still a tradition among the fins of the Firth that waterfalls that fall up are to be treated as guilty until proved innocent.

With between three and four thousand men at work, swinging in light cages suspended as by pack-thread, or sticking to ice-coated ladders as high as the top of St. Paul's, it may be imagined that there were accidents. Things were always dropping from aloft and killing people. But there were some odd escapes. Sir Benjamin records that a spanner—whatever that may be—dropped three hundred feet, took off a man's cap in its course, and plowed a hole clean through a four-inch timber! Another time a spanner entered a man's waistcoat and came out at his ankles, ripping open all his clothes, but leaving him unhurt.

Sir Benjamin Baker usually gets the credit for the great dam at Assouan, Egypt, which stores the flood waters of the Nile, and incidentally drowns out the exquisite temple ruins of Philæ. But he neither designed the dam, nor conducted the preliminary explorations. Nor was he even the constructing engineer. As consulting engineer he passed upon the plans of a young man named Willcocks, now Sir William Willcocks, adopted them, and gave the no doubt very valuable aid of his expert opinion through the triumphant operations. But it was hardly he who "arrested the tears of Isis weeping for Osiris."

He had, to be sure, the responsibility. He had to go counter to the advice of the native landholder, who assured him there could be nothing in the scheme for a dam, as it would have been done at least four thousand years ago. He had to take the risk of bracing up the temples at Philæ. "It need hardly be said," he writes, "that having regard for the shattered conditions of columns and entablatures, the friability of the stone, and the running sand foundations, the process of underpinning was an exceptionally difficult and anxious task."

But it is safe to conjecture that tampering with ancient Nubian temples did not give him a tithe the worry he felt when he drove a certain tunnel under Threadneedle Street between the Bank of England and the Royal Exchange. Francis Fox depicts the anxieties of the tunneller, boring beneath massive buildings or under tidal rivers with Atlantic liners and battleships floating above him. He pictures his agony when the timber bars and baulks begin to sag under the weight and it becomes necessary still further to weaken them by adzing away their lower sides in order to get in the full thickness of brickwork. A nightmare this, surely! But fancy the feelings of an Englishman who risks wrecking that cornerstone of the universe—the Bank of England!

Small wonder Sir Benjamin Baker succumbed at sixty-seven!—*Boston Transcript.*

COMMUNICATION

A CHURCH CANON ON ECCLESIASTICAL ARCHITECTURE.

18 Broadway, New York City,
June 3, 1907.

To the Editors of the American Architect:

Dear Sirs—

We are indebted to a client, the Rev. Walker Gwynne, of Summit, N. J., for the following information.

Henry M. Congdon & Son, *Architects.*

At the annual meeting of the Diocese of Newark the following report of the Special Committee on Church Architecture was read:

The committee appointed at the last convention to consider the proposed canon on Church architecture respectfully reports:

First.—That they are unanimously of the opinion that, inasmuch as the interests of every parish and mission in the Diocese are in a measure the interests of all, the formation of such a Commission as the canon provides is highly advisable.

Second.—That the effect of this Commission should not be mandatory in reference to the organized parishes, but only advisory.

Third.—That in the case of missions, which depend wholly or in part on the Diocese for support, the advice and approval of the Commission should be obtained before undertaking the work of construction.

Your committee believes that such a Commission as the canon provides would do much to elevate the character of our church buildings, as well as to guard against those serious errors of judgment and defects of taste which, with the best intentions, have so often imposed not only on their own generation, but also on many generations to come.

We are all agreed that the church building should attract and not repel. It should be an inspirer of reverence and devotion. In many ways it should be a teacher of truth. Moreover, for these purposes its power is not dependent on its costliness or its elaborate ornament, but on its conformity to those principles of taste and sacred art which the Church, with marvelous skill, has worked out and exhibited in all her long history.

In England, if not in the colonies, a faculty must be obtained from the ecclesiastical authorities of the diocese for all new churches, or for material change in the old ones. In a new land like ours some similar provision seems doubly needful. To quote the words of one of our best church architects: "It must always be borne in mind that in this country we are subject to a constant

tendency to degradation of taste in church art, because we are surrounded with so large a body of bad art that has become endeared to us by association, or to which we have become accustomed by constant contact."

Your committee is of the opinion that no such provision as this canon contemplates has yet been made in any diocese of the American Church. They believe, moreover, that, in view of the practical importance of the matter in secular as well as ecclesiastical affairs, as witnessed by the formation all over the land of "municipal art commissions," the Church should lose no time in taking some definite action such as that proposed.

We recommend, therefore, the adoption of the proposed canon with the addition of Section 2, making the approval of the Commission mandatory on missions, while leaving it only advisory in the case of parishes; with the further amendment of making the membership of the Commission appointive instead of elective.

The following canon was then adopted:

Resolved, That the following canon be enacted, to be known as Title I, Canon 10, "Of the Commission on Church Architecture."

I.—There shall be a commission of the Diocese, to be known as the Commission on Church Architecture, which shall consist of the Bishop, together with two clergymen and two laymen, to be appointed annually by the Bishop.

II.—It shall be the duty of every Mission receiving aid from the Diocese to lay before this Commission the plans of any new church or chapel, or of proposed changes in the construction of any existing church or chapel; and no such work of erection or change shall be undertaken until the said plans have received the approval of the Commission.

III.—It shall be the duty of every Parish, by its Rector, Wardens, and Vestrymen, to lay before the Commission the plans of any new church or chapel, or of proposed changes in any existent church or chapel, for their counsel and advice, which counsel and advice shall be given in writing within one calendar month after the receipt of said plans.

ILLUSTRATIONS

HOUSE ON HIGHLAND AVENUE, SEWICKLEY, PA. MR. H. D. GILCHRIST, ARCHITECT, PITTSBURGH, PA.

HOUSE OF A. C. MAGNUS, ESQ., WINNETKA, ILL. MR. R. C. SPENCER, JR., ARCHITECT, CHICAGO, ILL.
TWO PLATES.

COMMERCIAL NATIONAL BANK BUILDING, CHICAGO, ILL. MESSRS. D. H. BURNHAM & CO., ARCHITECTS, CHICAGO, ILL.

NO. 4925 BERLIN AVENUE, ST. LOUIS, MO. MR. M. P. M'ARDLE, ARCHITECT, ST. LOUIS, MO.

HOUSES IN BRUSSELS, BELGIUM. MM. HORTA AND HANKAR, ARCHITECTS.

For description, see article, "The Emancipation of Architecture in Belgium," elsewhere in this issue.

HOUSE ON WOODLAND ROAD, PITTSBURGH, PA. MESSRS. VRYDAUGH & WOLFE, ARCHITECTS, PITTSBURGH, PA.

HOUSE OF M. G. KELLOGG, ESQ., WOODLAWN AVENUE, CHICAGO, ILL. MR. W. A. OTIS, ARCHITECT, CHICAGO, ILL.

Additional Illustrations in the International Edition.

[Because of defects in the plates intended for this issue, defects that declared themselves at too late an hour to allow of the substitution of other subjects, publication must be deferred to our issue for next week.]

NOTES AND CLIPPINGS

THE CURSE OF UNIFORMITY.—The curse of our modern education is uniformity. Our public schools are bent on reducing the growing generation to an unrecognizable pulp, and many scholars seem to have chiefly in mind the normalization of knowledge. Librarians raised in the colorless Dewey system, school-teachers with a patented normal school education, pedagogy itself reduced from a liberal art to a barrack science—such are the desiderata of the day. What wonder, then, that we should aim after absolute uniformity even in spelling.—*Prof. Leo Wiener in Boston Transcript.*

THE CHRIST OF THE ANDES.—As we approach the top of the Chilean side, the zigzags grow more numerous and arduous, until, in looking back, one can count as many as twenty curves over which he has come. The scenery, at the same time, becomes bolder, grander, more sublime. Mountain peaks, twice ten thousand feet high, tower about us, and we are overwhelmed by their overpowering vastness and sterility. Nowhere, except in Montenegro and the Canadian Rockies, have I seen such massive natural monuments, and the latter are relieved by vegetation up to the tree line. There seems to be no tree line in the Andes. On the top of the pass is that remarkable statue of which Boston has often heard—an heroic figure of the Christ, upholding a cross. On the base of the pedestal are the emblematic figures of Chile and Argentina clasping hands as a symbol of their settlement of the boundary dispute, which at one time seriously threatened war; a war happily averted by arbitration, which assigned the summit of the Andes as the boundary between the nations. Under the pedestal is the inscription:

"He Is Our Peace
Who Hath Made Both One."

The magnificence of the surrounding scenery, the isolated loftiness of the natural pedestal and the character, the appropriateness and the beauty of the statue itself, all combine to make "The Christ of the Andes" perhaps the most impressive monument in the world.—*Rev. F. E. Clark, in Boston Trinscript.*

EXHIBITION OF GERMAN ART IN NEW YORK.—A plan is afoot in Berlin to hold an exhibition of German sculpture and interior decoration in New York next year. The honorary committee now being formed includes among its members Ambassador Charlemagne Tower. The intention is to make this exhibition representative of German sculpture and architecture as it exists to-day. The project has been laid before the Kaiser, who, it is said, will see to it that only such objects as suit his taste will be allowed acceptance by the jury. Forty sculptors have already signified their intention to contribute, and the committee of artists includes, among others, Reinhold Begas, Walter Schott, Adolf Brütt, August Gaul, Franz von Stuck, Fritz Schafer, and other sculptors. Dr. von Tschudy, director of the National Gallery; Dr. Treu of the Dresden Sculpture Gallery, Dr. Heinrich Wölfflin of the University, Profs. Robert Diez and Otto Lessing, Fritz Klinich, and Prof. Hermann Hahn are on the list, and other architects and sculptors will be added.—*N. Y. Evening Post.*

CROSBY HALL, LONDON, TO GO.—Crosby Hall, another of London's oldest and finest landmarks, is to be wiped out. This has been sold, to make room for city offices. Crosby Hall carries one back to the days of Roman invasions, for it forms part of the site of a Roman villa. This splendid piece of fifteenth century architecture stands in Bishopsgate. It was built by Sir John Crosby, "grocer and woolman," in 1466 as a dwelling-house. It had then the distinction of being the loftiest edifice in London. Sir John, like many other city merchants, lived in Bishopsgate, as it was near the country and Exchange alike. The history of Crosby Hall has been an eventful one. It is mentioned by Shakespeare, who lived close by, and Richard III. held his first council here. For years it was used to entertain foreign ambassadors to England; then the ancestors of the present Marquis Northampton bought it. For nearly a century it was a nonconformist meeting-house. In its later history it has played as many parts as in its earliest years, and now unless some philanthropist, interested in the preservation of buildings of rare history, interferes, this grand old hall will go the way of so many others in London and be demolished by the house-breakers.—*N. Y. Herald.*

SAN FRANCISCO'S EARTH LEVELS UNDISTURBED.—Professor George F. Davidson, President of the Seismological Society of America, said at a meeting of the Society, May 25, that earthquakes have caused no difference in the level of the earth's surface about San Francisco Bay since 1877, when he first began his investigation of earthquakes. At that date he had a solid concrete pier sunk to rock bottom off the Saucelito shore of San Francisco Bay, and, according to the most minute measurements, which he recently finished, there has been no change large enough for calculation. No changes of level have taken place, says Professor Davidson, except on alluvial or filled lands.—*Exchange.*

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AT the time of the California earthquake, the University of California was under obligation to contribute to the endowment of the American Academy of Fine Arts at Rome the sum of one hundred thousand dollars, and had actually secured from its friends and graduates about one-third of the amount pledged. Although the University of California did not suffer in loss or damage of its own property through earthquake and fire in the same degree that the Leland Stanford University at Palo Alto suffered, it was apparent that it could look for the balance of its subscription, in the main, only to those who, as individuals, had suffered losses through the disaster, and that it would, in consequence, be difficult and slow work to secure new subscriptions and the payment of those already made. In view of this, the authorities of the Academy perceived that the gracious thing for them to do would be, with the permission of the University, to absolve it from its obligations to them, and this has been done. But graciousness and generosity are generally costly as well as ornamental virtues and the cancellation of this subscription left the endowment-fund depleted, and to restore it to its full proportions the Society of Beaux-Arts Architects has come forward as the tenth subscriber and undertakes to raise through its members and friends one hundred thousand dollars.

THE "founders," as we believe the endowers are to be called—a title which seems to do injustice to those who conceived and actually wrought for the creation of the Academy of Fine Arts at Rome—consist, then, of five amateurs of art, Messrs. J. P. Morgan, W. K. Vanderbilt and James Stillman, of New York; Henry Walters, of Baltimore, and H. C. Frick, of Pittsburgh, together with four institutions of learning, Harvard, Yale, Columbia and Chicago Universities, and to these is now added the Society of Beaux-Arts Architects, who manfully undertake a task that many an older and more influential organization might well shrink from, seeing that, in a manner, they must look for aid to essentially the same men to whom Columbia, Yale and Harvard have already turned. But the Society has hitherto shown so much energy and dash in executing its several undertakings that it would not be a surprise to find that its contribution had been raised before some of the universities had completed theirs.

THE selection, not of an artist of any kind or a trained museologist, but of a classical scholar, an ordained Congregational minister, an archæologist, to fill the vacant post of Director of the Boston Museum of Fine Arts, will strike many persons as a peculiarly Bostonese action. As, however, the trustees have not shown themselves impetuous in reaching a solution of their difficult problem, it is fair to presume that in Arthur Fairbanks, Professor of Greek and Greek Archæology at the University of Michigan, they have found the man with the knowledge and the administrative abilities the office requires. Professor Fairbanks, now in his forty-fourth year, is a graduate of Dartmouth College, Yale Divinity School and the Union Theological Seminary. Since taking his degree as Doctor of Philosophy at Freiburg-in-Breisgau he has filled the Greek chairs and has lectured on religious topics at several American colleges. His special preparation for the work he now undertakes may possibly date from 1899, when he was appointed to a Fellowship in the American School of Classical Studies in Athens. Since that time he has acquired a familiarity with European museums of art, their contents and the methods after which they are conducted. As a writer he has produced several books dealing with philosophical and sociological topics and at least one book dealing indirectly with art, the *"Handbook of Greek and Roman Mythology,"* published a short time ago.

EARLY this month there passed away a man who for several years rendered the citizens of New York a service they knew nothing of, for the ordinary man does not realize that there is a Board of Examiners to whom appeal may be made from the rulings of the Departments of Buildings. Mr. W. J. Fryer had good training as an architect and engineer, but the greater part of his life was spent in connection with the manufacture of structural and ornamental ironwork and fireproofing, concerning which materials and processes he often wrote instructively for the professional journals. Because of his knowledge of these branches of the subject and a certain known aptitude for the work, he was, in 1892, made chairman of the State Law Commission, which established the Building Department as a distinct branch of the city

government and codified the ordinances relating to building, and in 1899 he was again a member of a similar commission which drew up the present building-law that is now undergoing revision.

IT is not quite "nice" to have the Pittsburgh daily papers insinuating that the selection of Mr. F. J. Osterling as architect of the much-needed high-school building for that city is being opposed by some of the architects in the city on the ground that he is not a member of the American Institute of Architects, and, if any such action has been had, the Institute officials would do well to administer a rebuke to the over-zealous partisans. It is true that Mr. Osterling seems to have a faculty for being often at the storm-centre when political bodies are known to be in the market as improvers of real estate, but other astute architects do not shun the agitated arena. It is true, too, that this second competition seems to be developing as much scandal as attended and finally wrecked the first one. In fact, it seems as if Pennsylvania would be the State of States to take up the matter of regulating by statutory enactment the method of procuring the designs for public buildings, and, as the Philadelphia Chapter usually finds itself in opposition to the methods that have hitherto prevailed, we will urge it to take up the suggestion we made a few weeks since and see if it cannot be put into working shape. As to the High-school matter, it is amusing to find it reported that Mr. Osterling was so occupied in promoting his claims that he forgot to observe the subpœna of the Capitol Investigation Commission and the sergeant-at-arms had to be sent to escort him to Harrisburg, though why his testimony should be desired there is not at present stated.

A CURIOUS bit of recent history has just come to light in New York that shows how important it is that architects should be letter-perfect in all municipal and other ordinances that affect building and buildings. It seems that both the architects and the owners of the interesting group of studio-apartment buildings on West Sixty-seventh Street—one of which was illustrated in our issue for January 5 last—overlooked the important fact that a clause of the "tenement-house law" forbade cooking to be carried on in the rooms (even if specially built for and equipped as kitchens) of any tenement-house that had a height greater than one and one-half times the width of the street on which it faces. As the law does not discriminate between the tenement-house for workingmen and the costly apartment-house for those who can afford better lodgings, this prohibition properly affected these studio-apartments, already in occupancy of the artists who had erected the buildings on a cooperative plan. Fortunately for the owners—and for the architects as well —they were able to secure the passage of a retroactive law that specifically exempted from the operation of the anti-cooking clause the three buildings already built. As the buildings—which provide suites composed of a studio having the height of two stories and living-rooms occupying the balance of the lower floor and a mezzanine or gallery above—are very attractive and popular, a fourth building of the same type has been erected by some of those interested in the earlier buildings, they thinking that what had been done once could be done a second time, and that a fresh law of exemption could be obtained as easily as in the first case. But Governor Hughes looked at the matter less favorably than his predecessor and has vetoed the enabling bill. The result is that the lessees of the apartments find themselves, each, with an unusable kitchen on their hands and forced to depend for their daily bread on a cooperative-kitchen which, under the "hotel law," can be established in the basement or elsewhere.

THE Supreme Court of the United States this month rendered a decision of very unusual importance in affirming the decision of the New York Supreme Court in the case of Sauer *vs.* the City of New York. Sauer sued for the removal of the viaduct which interfered with the enjoyment of his property, at Eighth Avenue and 155th Street, in New York City, depriving him of easy access and cutting off light and air, or, failing removal, he asked for consequential damages. The Court rules, in brief, that had the viaduct been erected by a private corporation, an elevated railroad for instance, damages could have been collected in accordance with established precedent; but as in this case the viaduct was erected by the municipality itself those precedents do not apply, and the suitor can have no relief. If the decision is correctly reported, it must be based on good law, although it seems very hard that a community should damage one of its own citizens and then deny him relief. Usually, when a community takes or damages property under the right of eminent domain, it offers compensation or grants the injured party the right to sue for more than it voluntarily offers, and even then it hesitates to undertake many desirable general improvements through fear of having to meet heavy consequential damages. This new decision seems to indicate the possibility of making more rapid headway with such desirable undertakings; but, at the same time, it seems to offer abundant chance for injustice, if the public officials happen to be arbitrary and ill-advised.

THE suit won this week by Mr. F. W. Meeker, a farmer, of Livingston, N. J., against the city of East Orange lends interest to a curious and interesting paper on the rights to subterranean water published, last month, in *The Building News* and worth the attention of those interested. The suit is an important one and of much general interest, as there are many communities which depend for their water-supply on pumping from so-called artesian-wells. Mr. Meeker alleged that the springs on his farm, upon which he depended for watering his cattle and for refrigerating his dairy, were dried up when East Orange sank twenty artesian-wells about a quarter of a mile from his place and began to pump from them. The rights in a subterranean stream, such as Mr. Meeker believes has been the source of the springs on his farm, seem not to have been determined in this country, and it is said that the city, of course, and Mr. Meeker, perhaps, will fight the matter to a final decision.

CEMENT FOR BUILDING CONSTRUCTION.[1]

EVER since this Committee was appointed it has been investigating the general subject of cement and concrete as used in various types of building construction, with a view to determining their value as a fire-resistive material, and endeavoring to formulate a standard specification for their use which should be both safe and commercially practicable. This has been no easy task, since the real nature of cement itself and its action under varying conditions when combined with other materials have been so little known, and have been the subject of such wide differences of opinion between various authorities; and, furthermore, there has been so very little experience in actual fire with buildings of any sort of concrete construction. However, the past few years have marked rapid progress in the concrete building art, and while it is still far from perfection, and high authorities still differ on some technical points, they are getting nearer together on the fundamental features, and we believe are sufficiently agreed on such points as pertain directly to fire-resistance to warrant the recommendation, in rather general terms, of a specification for reinforced-concrete building construction.

The National Board of Fire Underwriters, through its Committee on Building Construction, has recently issued a revised edition of a Model Building Code, and is urging its adoption by municipalities throughout the country. The section (No. 110) of this code referring to reinforced-concrete construction has been somewhat revised and is submitted as being as practical and acceptable a specification as the present state of the art will permit. It is, of course, expected that in time experience will necessitate modification or amplification of this standard, but your committee is unable to foresee any probability of sufficiently important developments in the near future to warrant further delay in the promulgation of such rules as experience has already proven wise.

There are three general features of this specification which we feel warrant especial emphasis, features which experiences of the past year or two particularly have amply proved as being those always likely to need the most careful consideration on the part of all concerned, viz.:

Design of Reinforcement.—While this is a point on which there is more difference of opinion between engineers than any other, the specifications here outlined have been drawn by eminent authorities, and we believe will produce a building safe from all points of view, and will meet with as nearly universal approval as any specification which might be devised at present, and at the same time are sufficiently broad to accommodate the special features of many so-called "systems."

We would also call attention to a point omitted in the specification, namely: that the design of such buildings should be undertaken only by engineers of special training and experience along this line. Some of the alluring advertisements of patented systems of reinforcement may seem to indicate that the erection of a building using some particular design is easy, and does not require much experience, etc., but the fact is there are many intricate questions which cannot be solved by the aid of advertising text-books or stereotyped specifications, and we would urge that the design of a building of this type should only be entrusted to trained engineers of recognized ability in this particular direction, just as would be the case if a steel-frame building or bridge of equal importance was under consideration.

Insulation of Steel Reinforcement.—In our report of 1905 this matter was discussed at some length, and the result of tests given, which we believe indicate the necessity of better insulation than the one-inch thickness which present practice generally provides. We have no further comment to make on the basis of experimental tests, but practical experience since that time, particularly in the San Francisco fire, has amply demonstrated the need of heavier insulation.

There were thirty-one buildings involved in this great conflagration having more or less concrete construction. In most of them the concrete was used only for floor panels between steel beams, and was made, in some cases, of cinders, but chiefly of stone.

After the fire some of these floors were found in fairly good condition; that is, in cases where steel columns and girders supporting them had been sufficiently insulated from heat to stand up. In most cases, however, the protection on columns and girders was so thin, or frail, or of such poor material, that the steel members either collapsed or buckled so badly as to ruin many of the floor slabs.

There were no buildings involved having reinforced-concrete columns, but there were several which contained beams and girders of reinforced-concrete, and from these we may draw valuable lessons on this question of the insulation of steel.

First.—The Young or Seller Building, corner Market and Spear Streets, was a five-story structure with brick walls and steel frame with intermediate floor beams of concrete, having a most primitive type of reinforcement, which though probably not in favor anywhere at the present time, serves as an extreme illustration of the point under discussion. These beams were in effect reinforcing webs projecting from the lower face of the floor slabs and consisted of a flat-rolled steel strap about 5 inches wide by 3/8 inch thick, with each end hooked over the upper flange of steel girders and bowed downward so that its centre hung about 8 inches below the lower face of the slab. On the top of this suspender strap was formed the concrete beam or web. There being no protection for the bottom or edges of the steel strap, of course, it was quickly heated up to a point where it failed to carry its load, and the floor either collapsed or was badly deformed, the amount of damage depending upon the amount of heat in different localities.

The Hall of Justice was of practically the same construction and suffered the same damage to a somewhat less degree, owing to the protection of suspended metal-lath and plaster ceilings.

Construction of this type is probably a thing of the past, and would not be recognized as worthy of the term reinforced-concrete. It is cited here, however, to illustrate the point that steel reinforcement needs adequate insulation.

Second.—The Johnson Building, corner of Minna and First Streets, a five-story brick-walled structure, occupied for harness and leather goods store. In this case the columns and main girders were of steel, but there were numerous intermediate floor beams of so-called reinforced-concrete, although the reinforcement in this particular case seems to have been hardly worthy of the name. Instead of a well-selected type of steel bars made for the purpose, it seems that a miscellaneous collection of old, twisted wire and various sized rods were used, which, even if in good condition, were not heavy enough to carry their loads with safety, and, furthermore, were located not over one inch from the bottom face of the beams.

The contents of this building undoubtedly produced a hot fire, though not at all abnormal for a mercantile house, and the result was the collapse of a portion of the building, and such a serious cracking and bending of most of the beams and floors as to render them valueless for further use. Bad design and improper insulation both contributed to the serious failure in this case.

Third.—Pacific States Telephone and Telegraph Company's main office-building, on Bush Street. A brick-walled steel-frame building, with flat gravel-concrete floor slabs between beams. In the roof construction were a number of small-sized intermediate beams of reinforced-concrete, having their steel members imbedded apparently about one inch from the lower surface. The upper stories of the building were filled with supplies of various kinds, and the heat was naturally severe in these upper stories, including the one immediately under the roof. These concrete beams were badly deflected, one of them failing entirely. In this case the steel columns throughout the building were insulated by 3 inches of stone-concrete, and, to the best of our knowledge, were not themselves injured, although the concrete covering was naturally weakened for some distance from the surface and will doubtless have to be replaced.

Careful Workmanship.—The necessity for improvement along this line has long been recognized, and here, at least, there is little possibility of disagreement as to what is needed.

The experiences of this past year have given additional proof of the gross carelessness and incompetence which have prevailed in many important works. There have been several instances of the collapse of large and expensive buildings in course of construction which have in every case been traced to neglect of well-known rules of safety. For instance, in one case the direct superintendence of the work was left to cheap help, who did not appreciate the necessity for accurate and careful workmanship, and the result was too little cement, too little water, or improper mixing, which allowed the collapse of the wall before it was half up. In several cases the concrete has been allowed to

[1]Report presented at the annual meeting of the National Fire Protection Association, in New York, May 22-24, 1907.

freeze while under construction, and, naturally, it fell down on removal of forms.

The wooden moulds or forms have not been properly cleaned out before receiving the concrete, with the result that shavings, blocks of wood and other refuse have been embedded in concrete in such a way as to make a vital weakness at important points in the building. Certain steel reinforcing rods, called for by the plans, have been either misplaced or omitted entirely, which together with unsafe design of original plans, caused one very serious collapse. Concrete foundations have been laid in mud, with the natural result that they failed to support the super-structures. Blocks of wood, for the purpose of holding fixtures, have been found purposely cast in the bottom of beams in such a way as to directly expose the steel reinforcement when the said block was burned or knocked out.

While calling attention to the unusual number of such failures occurring in the last year, it is only fair to admit that the number of buildings erected is also very much greater than in any previous year, and the proportion of failures may not be so much larger. Moreover, it is very encouraging to notice the extensive discussion which these failures have provoked in engineering journals, and the widespread condemnation by the public in general of the methods which have allowed these accidents, all of which must naturally tend to prevent, in some measure, the repetition of the errors in future by making it a commercial necessity for concrete builders to regulate this personal element, which is especially prominent in concrete work, in order to insure a sufficient degree of public confidence to secure permanence of their industry.

The section of the Building Code submitted refers especially to structures of reinforced-concrete throughout, but the rules are also generally applicable to concrete floors and roofs between steel beams and girders, as far as they relate to preparation and handling of the concrete itself. In such steel-framed buildings concrete may safely be used for floor and roof slabs and for insulation of steel-work, provided it is of the specified quality, is securely attached to the steel member by steel rods, expanded metal or woven wire and is thick enough to protect against penetration of heat, which thickness in the opinion of this committee should be not less than 4 inches on all columns, 2 inches around and under all ordinary beams and girders, and 4 inches on the sides of large, heavily loaded girders in mercantile or storage buildings.

These rules are intended to provide for buildings of any ordinary occupancy, including mercantile or manufacturing houses or buildings subject to conflagration exposures, and we believe such structures built in strict conformity with these specifications, though not fireproof to the last degree, will be found sufficiently fire-resistive to merit the term "fireproof," as generally used. This, however, is far from suggesting that concrete buildings as now being constructed are to be so regarded. The general practice at present, as already pointed out, involves too much carelessness in workmanship and too little insulation of steel-work, defects which may not appear as vital under slight or moderate fire-tests, but which in many cases would surely so appear, if the building were to be subjected to a long-continued hot fire, as from the burning of a stock of merchandise, or the severe attack of a conflagration.

Hollow Concrete Blocks.—The past year has witnessed a wide increase in the production of these blocks for various purposes, but no important changes in method of manufacture or use.

The formulation of a standard for the manufacture and erection of these blocks has had the careful attention of this committee, but such action has thus far been deferred in the hope that field experience and laboratory-tests would develop a general line of practice which might be found both safe and practical, and we still believe that before a final conclusion can be reached as to just what materials, what shapes and sizes and methods of manufacture produce the most fire-resistive blocks, it will be necessary to await further laboratory-tests, particularly those under way at St. Louis. For the present we have to report that this year's investigations of the subject have tended to strongly confirm our previously expressed view that well-made blocks are suitable for small buildings, where no high temperatures or long-continued fires are to be expected, but that the hollow form in which they are made absolutely precludes their being classed as highly fire-resistive, or suitable for fire-walls, or for any buildings which may be subjected to severe fire.

The extensive series of tests under the auspices of the Government at the St. Louis laboratories and our Chicago laboratories jointly are not completed, and we do not feel justified in making any extensive report on progress. However, we are at liberty to say that in the fire-tests thus far made, as well as similar tests conducted for the city of Washington, D. C., practically all of the samples have been broken or cracked from unequal expansion of the various sides.

This committee also made a similar test about two years ago, which has not heretofore been reported, for the reason that we did not feel justified in drawing conclusions from a single trial of blocks of one type; the result, however, was concurrent with those of the other tests referred to.

The reason for such breaking is perfectly clear; concrete has almost exactly the same coefficient of expansion as steel; that is, it will expand at the rate of about .000006 of its length per degree of temperature, so that if one side of a hollow block be subjected to a severe fire long enough to heat it to several times the temperature of the other side (the connecting webs or sides being absolutely rigid and non-elastic), there must be a break between two sides. Of course, the thicker the wall or shell of a block is, the longer time will be required to heat it to the breaking point; hence, the thicker the shell, or, in other words, the nearer the block comes to being solid the less likely it is to break under fire.

This objection of breaking by unequal expansion applies particularly to the simple, hollow, box-like block which is the one by far most commonly used at present, though it also doubtless applies in large measure to the so-called two-piece blocks, whether the inner and outer pieces be tied together by metal bonds or by irregular projecting wings of the block itself. In such cases the expansion of the inner side or wall would doubtless tend to break the bond between the two and seriously weaken the wall.

One of the most recent forms of concrete-block is a small solid block the size and shape of an ordinary clay brick and to be used in the same way. From the standpoint of fire-resistance the only objection to be offered against such blocks is that the cement, like that in any concrete, whether in block or monolithic form, will dehydrate in time on the application of high temperatures, and they are, therefore, less fireproof than good, well-burned clay brick, though it would seem that for most ordinary small buildings such small blocks may be rated as equal to common brick for walls of the same thickness.

The larger solid blocks of so-called artificial stone made of finely-ground stone and cement, which are used largely for decorative purposes, would doubtless compare favorably with natural stone, and as is the case with stone, any carved or uneven surfaces would doubtless suffer similarly from heat.

While we are not prepared to submit a detailed standard for the manufacture and use of hollow blocks, and even doubt the necessity for attempting to regulate very closely the manufacture of a type of building material which can only be recommended for low credit in fire-resistance, the fact must be recognized that the material is being very extensively used and commercial necessity demands that it be given some definite grade as compared with other building materials. We, therefore, beg to state our opinion that a hollow concrete-block wall is better than a frame wall for the simple reason that it is incombustible and will withstand moderate fires which would feed upon and destroy wood, but it is inferior to a brick wall on account of liability to breaking from unequal expansion, probability of continuous cracks through wall at imperfect mortar joints, and especially on account of present tendency to poor workmanship in manufacture.

The regulation of this personal element of workmanship can only come about in the course of years of experience and the recognition and control of it from our point of view will have to be left to the individual judgment of various authorities having local jurisdiction. In other respects, the highest fire-resistance will be found in the block that has—

First. The thickest shell, or being nearest solid (should never be less than 2 inches thick).

Second. That contains a good brand of Portland cement tested and found to conform to the standards of the American Society of Civil Engineers or similar specification.

Third. That contains one part cement to not more than four parts sand or other aggregate.

Fourth. Is made with the wettest mixture practicable.

Fifth. Is most carefully cured or aged not less than thirty

days before using, during which it is frequently moistened by water spray or steam.

Sixth. Which provides solid blocks for the course on which joists or girders rest instead of allowing said timbers to rest on or hang to the inner side of a hollow shell which may break off.

In conclusion, we would recommend the continuance of the committee, for the purpose of collecting more complete data on various phases of the subject and reporting tests or experiences of interest, and would urge at the same time that members make a special point of informing the committee in detail of any fires they may learn of involving concrete in any form.

Respectfully submitted.

EDWARD T. CAIRNS, *Chairman.*

THE PUNG-DUK PAGODA AND OTHER LOOT.

APROPOS of the reported rape of a treasure of Corean architecture, to which we referred the other day, "Ex-Attaché" writes in the New York *Tribune* as follows:

Viscount Tanaka, Minister of the Imperial House to the Mikado, was charged a few days ago in a letter addressed from Nagasaki to a New York newspaper with having carried off bodily from Seoul to Japan the Pung-Duk Pagoda. The latter is described in the letter, which has attracted widespread attention, and been extensively quoted, as being "an exquisite national monument of white marble," as one of the "most ancient and sacred of the nation's ancestral shrines," as a "priceless monument of the former greatness of the Hermit Kingdom," as "national property," and as "composed of innumerable beautifully sculptured blocks of marble." The writer of the letter goes on to compare Viscount Tanaka's "robbery" of the monument to a hypothetical spiriting away of General Grant's Tomb from New York, of the Washington Monument from Washington, of the Nelson Column from Trafalgar Square, in London, or the Arc de Triomphe from Paris, by some alien statesman or government too powerful to be prevented from committing the act of spoliation.

To any one who has visited Corea it is manifest that the writer of the letter in question can never have seen the Pung-Duk Pagoda. In the first place, it is not of marble, but of white granite, somewhat discolored with age. Secondly, it is not, properly speaking, a real pagoda, but a monumental structure in the form of one, and is composed, not of many blocks of marble, but of two huge pieces of stone. It is less than twenty-five feet high, is carved to represent a pagoda, and shows here and there some exquisitely chiseled bas-reliefs of celebrated personages. It is not a national monument, nor yet a sacred ancestral shrine, neither is it national property. It belonged to a private citizen, was until the other day a completely neglected monument in his backyard at Seoul, and was sold by him in due form to Viscount Taenaka, who had it carefully removed, without any attempt at concealment and without encountering any opposition on the part of the people of Seoul, the removal occupying about eight days' labor.

The pagodas, as probably most of my readers are aware, are supposed to be, not a unit, but a conglomeration of buildings of the ordinary Chinese type, placed one above another, skyward. Each of these stories, the number of which varies, typifies a Buddhist heaven. They represent the successive stages through which the soul in its advance toward purification must, according to the Buddhist doctrines, inevitably pass. As the pagoda is essentially an expression of the Buddhist faith which was discarded centuries ago by the Coreans, it is misleading to describe it as in any sense whatever a sacred shrine, or as an object of reverence. In fact, its removal by Viscount Tanaka to his home in Japan cannot be considered in the light of an act of spoliation by the Japanese government at the expense of a vassal and powerless nation, but rather as a private commercial transaction, much of the same order as when J. Pierpont Morgan buys some fine piece of ancient statuary in Europe from its owner to adorn his home or his library in Madison Avenue, New York, or his mansion in London.

While Viscount Tanaka has purchased the Pung-Duk Pagoda on his own account, it is possible that he may present it to his sovereign, and that its ultimate destination may be the gardens that encircle the imperial palace at Tokio. But wherever it is reconstructed in Japan, it is certain to be treated there with an infinitely greater amount of respect, and even reverence, than at Seoul, where it was subjected to the utmost neglect and indifference.

Even if this little 24-foot imitation pagoda, so puny when compared with General Grant's Tomb on Riverside Drive, or with the Nelson Column in Trafalgar Square, London, by the writer of the letter from Nagasaki had been a great national monument and had been forcibly carried off from Seoul by the Japanese government, instead of forming the subject of sale between the private citizen to whom it belonged and Viscount Tanaka, the Japanese would have had plenty of Western precedent for such action. There are few capitals in Europe where the national museums and galleries, as well as the palaces of the rulers, are not adorned with works of art and with monuments that are held as trophies of victory. In fact, there are few celebrated art collections belonging either to the Crown or the State which would not be lamentably depleted, and robbed indeed of their most precious treasures, were they to be forced to surrender all that had been taken in war, or as a fruit of the latter. No victorious commander, however, carried looting to quite the same length as the First Napoleon.

During the sixteen years that preceded the battle of Waterloo, when his despotic sway extended over the length and breadth of continental Europe, he took advantage of his power to despoil public institutions, royal and private palaces, and even religious edifices, in Spain, Italy, Germany, Austria, the Netherlands and Russia of their finest art treasures, carrying them off to Paris, his depredations in this respect extending even to the land of the Nile. After his downfall and the occupation of the French capital by the allied forces, the latter at once took steps to resume possession of their national chefs d'œuvre of art and archæology discovered in the Tuileries, at Fontainebleau, at Compiègne, and in the various public buildings of the Gallic metropolis. In this way Venice recovered her famous bronze horses, of which she herself had plundered Constantinople in 1206, and which for nearly six hundred years had surmounted the entrance of her Cathedral of San Marco, until Napoleon bore them off, as part and parcel of his loot, to Paris to crown the triumphal arch in the Carrousel, from 1797 to 1815. In the same manner, Raphael's grandest masterpiece, "The Transfiguration," was restored to its place on the walls of the Vatican, after an absence of fifteen years in Paris.

There were many such treasures, however, which were beyond recovery, which had been presented by Napoleon to his generals, or which he had allowed them to retain at the time of the victory as their share of the plunder, and which they had subsequently sold to third parties. It was thus that the entire collection of Spanish old masters which Marshal Soult had carried off from Madrid and other cities of the Iberian peninsula was irretrievably lost to Spain. Perhaps the grandest painting of the lot was Murillo's "Immaculate Conception," which had belonged for centuries to the Hospital de los Venerabiles Sacerdotes, at Seville. Soult seized it, took it back with him to France, sold it there, and after remaining in private hands for a couple of decades or so, that is to say, until long after the Allies had withdrawn from Paris, it was acquired through a perfectly legitimate purchase by the Louvre, where it is now regarded as one of the principal art treasures of France's great national museum.

Those paintings which had escaped Marshal Soult were seized by King Joseph Bonaparte, whose plunder represented many of the most valuable old masters of the National Gallery of Madrid. When King Joseph was driven by the English to abandon his Spanish crown and to retreat to France he carried with him these paintings in his immense baggage-train. The latter was captured by the Duke of Wellington and shipped off to London, along with other belongings of the British commander. They remained in England in their packing-cases until after the downfall of Napoleon and the return of the Duke of Wellington to England. King Ferdinand, learning that the paintings in question were in the possession of Wellington, at once requested him to keep them as a token of the gratitude of his people and of himself for the services rendered by the Iron Duke in expelling the French invaders and in placing him (Ferdinand) once more on the throne of Spain.

It is only fair to add that Napoleon and his French generals were by no means the only offenders in this spoliation of the public institutions of the enemy. The practice was one which was generally recognized and tolerated by international law, and in 1815, when the Papacy recovered its painting of "The Transfiguration," by Raphael, as above described, it was forced to surrender to Germany the treasures of the Palatine Library of

Heidelberg, which had been looted in the Thirty Years' War, and which for the two subsequent centuries had been preserved in the Vatican.

Nowadays looting in wars between civilized nations has been virtually abandoned. It is, however, still tolerated in conflicts with barbarous or semi-barbarous foes. In fact, laws still exist unrepealed in England, as well as in most other monarchical countries of Europe, vesting in the Crown—that is to say, in the sovereign—the right to all loot taken in war. It is only after the anointed of the Lord or his representative has had his pick that the remainder is either distributed among the troops or sold at auction, and the amount realized divided among them in a ratio proportioned to their respective rank.

Perhaps the most striking illustration of the ethics which now prevail about such matters is to be found in the fact that, although every Western ruler whose troops took part in the march on Peking by the allied forces six years ago obtained a portion of the plunder of the Forbidden City—Emperor William receiving a quantity of extremely interesting astronomical instruments several hundred years old, which are now among the attractions of his Palace of Sans Souci, at Potsdam; while the London illustrated papers published photographs of large cases of plunder in the Imperial Palace at Peking addressed to Windsor Castle—yet there was not a single looted French clock or any other bit of plunder in the Franco-German War of 1870 to be found in the palaces of the Kaiser or of any other of his fellow German rulers, in spite of the widespread impression among the French people to the contrary. But, then, the French were a civilized nation, professing Christianity, and of the white race, instead of being yellow Asiatics or dusky Africans.

As most of England's wars in the last hundred years have been with Asiatic and African potentates, it is not astonishing that many masterpieces of Oriental art obtained in this fashion should be found at Windsor Castle. Among them is the celebrated Uma, a jeweled bird about twelve inches long, shaped like a pigeon with an exaggerated tail. Rubies, diamonds, emeralds and pearls are sewn about the quivering feathers of golden filigree work. It holds a priceless ruby in its beak, and an emerald of immense size and lustre hangs from its breast. There are many legends woven about this bird in the Orient. The Hindus have given it the name of Uma, and are convinced that whoever owns the Uma must reign over India. Indeed, the fact that both the Uma and the great Kohinoor diamond are owned by King Edward makes it almost a matter of course for the native Princes of Hindustan to acknowledge him as their liege lord. It may be a bitter and bewildering thing, this rule of an alien from the West. But in the opinion of these dusky potentates the powers above have willed it so, and pious souls must bow in solemn obedience to the fiat of fate.

The Uma figured in olden times on the canopy above the throne of the great Indian Emperor, Tippoo Sahib, and after being taken from him was presented by the East India Company to King George III. Sometimes it figures on the principal sideboard at the dinners at Windsor Castle, but more often still it appears on the royal dinner table. The Uma represents the loot of a victory. But the Kohinoor diamond, formerly the token of majesty of the rulers of the Punjab, was yielded in time of peace to the British Crown by way of a tribute of submission. Other treasures of the same kind at Windsor Castle are the splendid regalia of King Thebaw of Burmah; the gold armlets, collar and diadem of the two kings of Ashanti; a quantity of beautifully carved elephant tusks which belonged to the African King of Benin; while the state umbrella of the Kings of Ashanti is preserved at the South Kensington Museum.

Of course, it is not agreeable for nations to feel that their most cherished possessions are in the hands of an alien power. There is always a sort of instinctive resentment against the stranger in the affair, no matter whether he has obtained the treasure by spoliation, gift or legitimate purchase. Thus, the Spaniards still harbor resentment against the Duke of Wellington on account of the old masters now adorning the walls of Apsley House and which formerly belonged to the National Museum at Madrid, and the Greeks are never tired of reviling England for her possession, at the British Museum, of the famous Parthenon marbles. Yet the latter were obtained by the seventh Earl of Elgin through purchase, with the approval of all the cultured Greeks of the day, who not only rejoiced in the sale of the marbles to the Earl as the only available means of preserving some of the grandest masterpieces of the plastic art of ancient Athens, but positively groaned at the fate of those sculptures that Lord Elgin left behind, realizing that they were suffering wellnigh daily injury from the effects of the weather, from vandal tourists, and at the hands of the natives, who looked upon the ruins of the Parthenon in the light of mere stone quarries.

A full justification of the disposal of the Elgin marbles to the seventh Lord Elgin is supplied by the deterioration which the sculptures which were left at the Parthenon have suffered since his time. Indeed, even recently the dilapidation has been going on, for a careful comparison made by the late A. S. Murray, of the British Museum, of photographs taken in 1897, with plaster casts executed in 1872, shows the most lamentable and extensive injuries, whereas the Elgin marbles in the British Museum have suffered no harm whatsoever since they were placed in that world-famed institution more than three-quarters of a century ago, after their acquisition by the trustees from the Earl and their removal to the museum from his house in Piccadilly, which Byron unjustly satirized as a

general mart
For all the mutilated blocks of art.

Viscount Tanaka is apparently doomed to share the unmerited fate of Lord Elgin in being denounced as a spoliator and robber of national monuments. But, judging from the shameful neglect to which the Pung-Duk Pagoda was subjected at Seoul, amid its sordid and filthy surroundings, it is a service which the Japanese statesman has rendered to the cause of archæology by thus adopting much of the same means as Lord Elgin in the case of the Parthenon marbles for the preservation at Tokio of one of the most ancient masterpieces of the plastic art of the Hermit Kingdom.

NEW YORK CITY'S GEOLOGIC STRATA.

UNDER the supervision of Dr. E. O. Hovey, of the Geological Department of the American Museum of Natural History, an elaborate exhibit showing the character and formation of the great bed of rock known as Manhattan Island is being prepared at the museum. By means of borings taken from deep excavations Dr. Hovey is already able to show specimens of rock from a depth of 350 feet and expects in a short time to have specimens from a much greater depth. So far specimens from that depth have been secured in that part of the island lying between Liberty Street on the south and Seventy-second Street on the North. The specimens so far are alike.

It was nearly five years ago that Dr. Hovey conceived the idea of preparing, for the aid of constructing engineers, contractors and others interested, an exhibit showing the nature of the bed on which the second city of the world is built. Specimens of the rock to a depth of sixty and seventy feet were plentiful; they could be secured any time at the excavations for the foundation of a new skyscraper. But to acquire specimens from further down was a puzzle. However, the invention of the plunger type of elevator about that time removed the difficulty.

Elevators of this type are now being used generally in tall buildings. The car is raised by a huge beam usually ten inches or a foot in diameter. When the car is at the bottom of its shaft the raising beam is sheathed in a straight bore which goes down into the earth a distance equal to the height of the building. If the car has to travel 300 feet from the basement bottom to the top floor, then the bore for raising beam must be 300 feet deep, with an additional ten feet to admit the placing of the machinery which raises the beam.

By consulting the contractors Dr. Hovey was able to secure the rock cores taken from some of these bores. The bores are made with a hollow drill and the core comes out in solid, cylindrical pieces of rock ten to fifteen feet long. Nothing could better show the formation of the rock. Dr. Hovey planned at first to polish the specimens, but found them of a rock known as "mica shista," which is of too uneven hardness to permit of polishing. So far the cores from twenty-two borings have been secured. Borings from the west building on the south and the Ansonia apartments on the north are the extremities of the ground examined. Regardless of the depth or the place of boring, the rock continues to be mica shista, the same type which may be seen in the great, protruding boulders in Central Park. Specifications for the new Singer Building call for an elevator of the plunger type, and here Dr. Hovey expects to get specimens from a depth of 650 feet.

From the subways Dr. Hovey also got valuable material, and these specimens are now on exhibition.

Speaking of the recent prophecies of a London seer who promised Manhattan an earthquake within a short time, Dr. Hovey said yesterday that this section of the United States has gone through its "shaky period" and is all settled down, proving that a seismic disturbance here is unlikely.

When the Pennsylvania tunnels under the Hudson River are completed Dr. Hovey will endeavor to secure material for an exhibition of the formation of the earth under the river and to show the difficulties encountered in making the tunnels.—*N. Y. Sun.*

THE HALL OF THE KNIGHTS AT THE HAGUE.

THE sittings of the Second Peace Conference will be held in a thirteenth-century castle built for the Counts of Holland in the days when they, together with the Bishops of Utrecht and the Dukes of Guelders, ruled the Low Countries. The "House in the Woods" ("Huis ten Bosch"), the former royal villa in the Haagsche Forest, in the "orange salon" of which the first Peace Conference met in 1899, was found too small to accommodate the delegates of the forty-six countries to be represented at the present conference, and the Dutch government decided to fit up and place at the disposal of its distinguished guests the ancient castle known in recent years as the Hall of Knights.

The Hall of Knights is a large, gloomy structure of stone and brick in the heart of an irregular pile of old, but more modern, buildings which, taken together, form the Binnenhof—the fortress of the city. The Binnenhof is the most historical spot in Holland, about it clustering the memories of the eighty-year struggle which finally resulted in relieving the Dutch from the Spanish yoke; the glories of the republic, when the States General ruled and the Staatholders lived here, when Dutch commerce was the largest in the world and triumphant Dutch warships even ascended the Thames and threatened London. The building of the old States General, lying to the north, is now used by the Upper Chamber of the Dutch parliament, while the ball-room of the Staatholders' residence, to the south, has become the home of the Lower House. The other buildings enclosing the square are used by the various government departments. Along one side of the Binnenhof is an artificial lake called the Vyver.

The Hall of Knights stands in the centre of a paved court, and is reached through half a dozen picturesque portals, over which are chiselled the arms of the Counts of Holland. The moat and postern have long since disappeared, and to-day the old building looks less like a castle than like an ancient church. Begun about 1240 by Count William II., afterward elected Emperor of Germany through the influence of Innocent IV., the building was extended by his son Floris, who used it as a hunting palace. The interior consists of a single enormous hall, occupying the entire space within the church-like structure in front, and a series of smaller halls and rooms in the rear. The large hall was the great dining-room of the counts and their knights when they made their hunting expeditions to the North Sea marshes. It is here that the plenary sessions of the Conference will be held.

After the rise of the republic the castle gradually fell into decay. Its main use in those days was for the drawing of the national lottery, which took place in the main hall, where the Conference will sit, and the name "Lottery Hall" still clings to it, although distinctly discouraged by the government. Toward the close of the eighteenth century a portion of the building was restored and decorated, and after Louis Bonaparte was expelled, in 1813, it was used as the seat of the high civil and criminal courts. The courts were moved several years ago, and in 1900 the work of restoration began. Since 1902 the main hall has been annually used by the Queen for the ceremony of reading the address of the throne to the Houses of Parliament.

THE HALL OF THE KNIGHTS, THE HAGUE, HOLLAND.

The hall is about fifty by eighty feet, and is lofty, but the huge beams and rafters of the vaulted roof give it a cavernous appearance. In preparation for the conference many electric lights, hanging from the rafters, have been installed to reinforce the dim light from the high, stained-glass windows. The desks for the delegates, arranged like pews in a church and flanked on either side by two lateral rows, are covered with green baize, and each has a single pewter ink-well set in the right-hand corner.

In front is a low rostrum for the presiding officer, with the desks of the secretaries arranged behind in the form of a semi-circle. The whole object apparently is to bring the delegates as close together as possible and permit an easy exchange of ideas. The general effect is one of extreme simplicity. The committee-rooms in the rear are spacious, but also somber.—*N. Y. Tribune.*

ILLUSTRATIONS

HOUSE AND STABLE OF E. P. LORD, ESQ., EDGEWORTH, PA. MR. CHARLES BARTON KEEN, ARCHITECT, PHILADELPHIA, PA.: THREE PLATES.

HOUSE OF SAMUEL ADAMS, ESQ., PITTSBURGH, PA. MESSRS. ALDEN & HARLOW, ARCHITECTS, PITTSBURGH, PA.

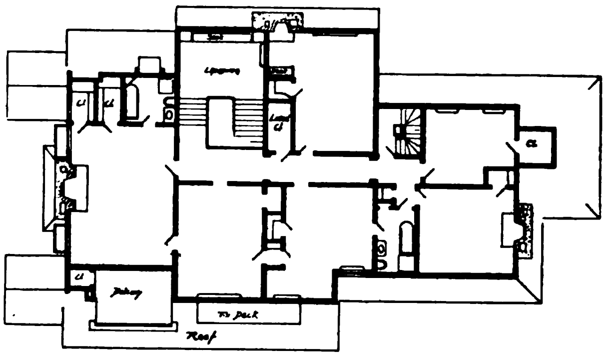
HOUSE OF NATHANIEL HOLMES, ESQ., PITTSBURGH, PA. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

HOUSE AND STABLE OF MR. STILLWELL, 5017 GREENWOOD AVE., CHICAGO, ILL. MR. JARVIS HUNT, ARCHITECT, CHICAGO, ILL.: TWO PLATES.

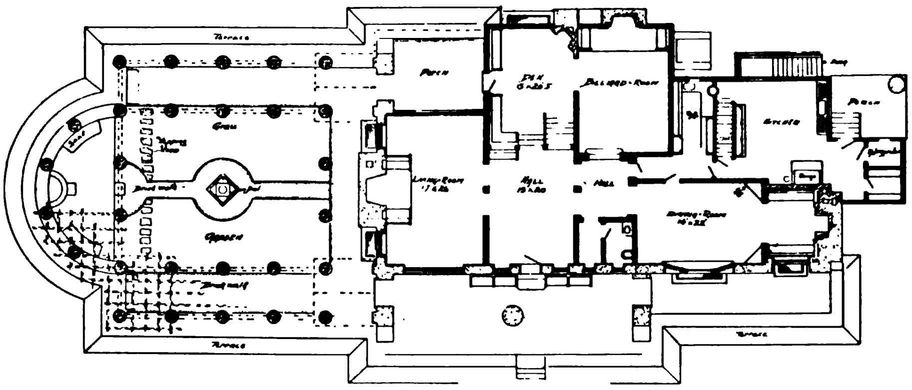
HOUSE OF CHARLES C. SPINK, ESQ., LINDELL TERRACE, ST. LOUIS, MO. MESSRS. BARNETT, HAYNES & BARNETT, ARCHITECTS, ST. LOUIS, MO.

Additional Illustrations in the International Edition.

DETAIL VIEWS: HOUSE OF E. P. LORD, ESQ., EDGEWORTH, PA. MR. CHARLES BARTON KEEN, ARCHITECT, PHILADELPHIA, PA.: TWO PLATES.



SECOND-FLOOR PLAN.



FIRST-FLOOR PLAN: HOUSE OF E. P. LORD, ESQ., EDGEWORTH, PA.

[CORRECTION.—We must ask our subscribers, particularly librarians, to substitute the names of Messrs. Alden & Harlow for that of Mr. Gilchrist as author of the house on Highland Avenue, Sewickley, Pa., published in our last issue.—EDS.]

NOTES AND CLIPPINGS

COAL-TAR CONCRETE.—The difficulty so long found in bonding together new and old concrete has been obviated by a recent patent. This bond consists of an extract of coal-tar, used instead of water as the mixing agent for neat Portland cement. The mixture is laid in one-eighth inch to one-quarter inch layers on the old concrete surface, and immediately followed by new concrete or mortar. The inventor says that the compound is entirely insoluble, and forms a complete and monolithic bond between the old and new work.—*Exchange.*

JOHANNES SCHILLING.—The venerable Johannes Schilling, the German sculptor, has become blind. He is in his seventy-ninth year, but at the time of his sudden affliction he was still actively occupied with his art. He will always be associated with the Franco-German war, for he executed several of the large memorials which were raised in various parts of the Empire. His vigor was equal to the undertaking of colossal works. The "Germania" for the monument on the Niederwald is 34 feet in height. He executed the statues of the Emperor William I. for Wiesbaden, Hamburg, Prenzlau, Dortmund, and others of Bismarck and Moltke. Few artists have accomplished so much in a period of thirty years, and the recollection of his industry should console the artist in his darkness.—*The Architect.*

THE PANTHÉON.—The Panthéon of Paris has been subjected to experiments which would have amazed Soufflot, the architect. Alternately necropolis and church, M. Dujardin-Beaumetz, the Under-Secretary of Fine Arts, now is eager to make it "le Temple des Apothéoses." As an experiment, he proposes to hold fêtes which will connect the great men to whom the building is dedicated with the modern life of France. With that intention the professors of the Conservatoire have been instructed to prepare hymns which will be suitable to the celebrations. M. Nénot, the architect, who has charge of the Panthéon, is now engaged in preparing a scheme of decoration for one of the fêtes. A commission has been given to M. Segoffin to prepare a memorial of Voltaire, and to M. Bartholomé for one of Rousseau. Several groups of sculpture are in hand, and M. Dujardin-Beaumetz hopes that some artist of genius will be inspired to create as the central adornment a great group which will be a glorification of France, and as large as so lofty a temple will allow without appearing to diminish the proportions of the shrine. —*The Architect.*

BOSTON'S GARDENS.—Very few nowadays remember that the Boston Public Garden was originally founded, too, for a botanic garden. The father of Judge Horace Gray was the indefatigable promoter of this idea (the forerunner and germ of the public parks idea) of such public gardens here as adorn the cities of the Old World. It was not until 1839 that he obtained from the city, with his associates, a lease of the margin of dump area then fronting on the Back Bay's two-mile expanse of water, and converted a large circus building standing just west of the corner of Beacon and Charles Streets into an immense conservatory for plants and birds. At last this building and its splendid collection were wiped out by a fire, and out of the thousand camelia Japonica plants, some of them thirty years old, with thousands of camelia blossoms in bloom at once, only a single camelia was saved alive. This was burned down nearly to its roots, but afterwards sprouted again, and at last accounts was flourishing in a green old age at Ridge Hill Farm, Wellesley. But there had been great gardens in Boston a hundred years before that; notably Gardiner Greene's, on the Beacon Hill slope, planted in terraces, with vines, fruit and ornamental trees; that of Dr. Shurtleff, where the Shurtleff grape originated; the splendid place of Governor Bowdoin, covering the top of the hill from Bowdoin Street to Ashburton Place, and that of Kirk Boott, one of the founders of Lowell, who had a great garden around the site of the Revere House, with rare plants obtained through the acquaintance which Dr. Francis Boott, a brother and a celebrated botanist in London, had with the Duke of Bedford.—*"The Listener," in Boston Transcript.*

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SOCIETIES, PERSONAL MENTION, ETC.

IT is not unlikely that a good many persons of a certain temperament find it regrettable that this country seems seriously to have entered on an epoch of cathedral building, and, on reflection, we incline to share their point of view through rather mixed considerations. In the first place, it seems to us that every modern cathedral church, whether successful or unsuccessful architecturally, whether built in this country or in Europe, in a very real degree belittles the dignity and degrades the character of the churches that have come down to us from the grand cathedral-building epoch. Those masterpieces of art are universally acknowledged to have been possibilities only through the self-sacrifice and reverent enthusiasm of the men who designed and built them, and it is the knowledge of these conditions, legendary though they may be, that lends to one's impressions a human poignancy that blends with the higher emotions which a temple of God, however modest and unbeautiful, always evokes. As it is very generally known that very little self-sacrifice, and still less reverent enthusiasm, is built into the walls of a modern cathedral, those who have this understanding will be likely to disbelieve that the old cathedrals were builded in any other frame of mind, and so will deny to them one of their most living and impressive characteristics, and this will be a loss.

FURTHER, the soul of man, in these times of ours, is to be reached mainly by the spoken word; it can be affected, subdued, chastened, perhaps, by the pleasurable sensations that reach the brain through the eye; but it cannot be informed in morals, ethics and religion save through the spoken word, and a word spoken unless it can be heard is wasted. Now, the new Cathedral of SS. Peter and Paul, at Washington, the design for which by Mr. G. F. Bodley and Mr. Henry Vaughan has just been approved by the Chapter and Council of the Diocese, is to seat a congregation of five thousand persons—provided such numbers ever present themselves—and we venture to think that, in a church which measures 476 by 132 feet, externally, while the interior height of the nave is 93 feet, the spoken word will be quite inaudible to a large part of the audience seated in the double-aisled nave. Such a result, of course, implies a great waste and, when one reflects that for the five million dollars this cathedral is to cost five hundred mission-chapels could be built, it seems impossible to believe that the churchmen are altogether right in their undertaking.

AS nearly as we can make out, the cathedral-promoters are carried away by a sort of *post hoc propter hoc* belief, in a very mistaken fashion. In their desire to stem the current of modern materialism and irreligion, they seem suddenly to have turned their eyes to the cathedrals of the old world and then imagined that they recognized in them not an effect, but a cause: they seem to have understood that it was because cathedrals existed that people were fervent of faith, not that through and because of the existence of an abiding and abounding faith the men of those times were able to create those impressive monuments. Although such reasoning surely is inverted, we all may hope that a satisfying, if not far-reaching, reformation may attend their efforts. Meanwhile it must be conceded that as a part of the municipal scenery, as one of the items of a community's wealth, as a landmark along the pathway of art, a cathedral building may be fairly held to be worth its cost, whether in fourteenth-century guise it seems to ape the work of the men who created the style or whether, like the Westminster Cathedral, it seems to explain more clearly the humanities of the day that gives it birth. Even then, some will be found pondering the question, is the modern cathedral really erected to the glory of God, or of the bishop, or of the architect?

A FEW years ago, because of disputation over the matter, the American Institute of Architects examined the evidence accessible and decided that as between Messrs. Bradford L. Gilbert, L. S. Buffinton and W. L. B. Jenney, all architects of standing, the latter had the better claim to be considered the originator of the modern method of steel-skeleton construction for high buildings. There is some reason for believing that the dismantling of the old shot-tower in "the Swamp" district in New York City that is now going on may, as the structure was erected in 1856, prove that the method was in its essentials employed before Colonel Jenney built the Home Life Insurance Building in Chicago. But Colonel Jenney passed away in Los Angeles on Saturday last still in the belief that his claim to original authorship was undisturbed. As an official sketch of Mr. Jenney's pro-

[1] See "American Architect" for May 20, 1905.

'fessional career was published by the Illinois Chapter A. I. A. at the time ill health caused him to abandon his practice and seek new strength in California, we will not here recapitulate its incidents. Mr. Jenney was markedly an American of the New England Yankee type, and the mixture he presented of shrewdness, humor, alertness of mind and body, and hard-headed good sense made him a notable and somewhat picturesque figure at the meetings of the American Institute of Architects, which he attended with unfailing regularity.

MAYOR McCLELLAN, of New York, having full knowledge of the painfully ineffective methods practised by the Street-cleaning Department in that city, has expressed the wish for ten thousand dollars with which to pay a commission, consisting of Messrs. H. de B. Parsons, S. S. Whinery and R. Hering, to report on an improved method of cleaning the streets and disposing of the city's waste. Excellent and effective as were the methods devised by Colonel Waring a dozen years ago, they never were perfected as he hoped to perfect them, and many of them have fallen into desuetude. Moreover, the city has grown considerably since his time, and by adding to itself other towns has forced on the Department a street mileage and area many times greater than it at first had to grapple with. The work to be done is enormous in amount and inevitably costly, but a good deal of alleviation can be secured by simple preventive laws and more efficient policing. Building operations, particularly the teams employed in them, contribute to the detritus that has to be removed by the Department a greater amount than does any other industry, and those who conduct them are using, or misusing, the common property of all in an unfair way and should be obliged to make compensation in some manner. For instance, wherever excavation is going on, the contractor and owner should be obliged to keep the street for one block on each side of the site in immaculate condition and, as teams follow practically beaten routes to the dumps, the collective teaming contractors of the city should be made to maintain along the entire route an additional street-cleaner for every municipal "white wing" regularly employed on the streets affected. Owners of carts with loose tail-boards and drivers of loads improperly trimmed should be persistently fined, until a cleanliness of traffic has been secured as automatic in action as the flow of traffic has now become.

EVERYONE knows that for many years the Passaic River, which receives the sewage of Newark, Paterson, Passaic and others towns, has been a sanitary disgrace to the State of New Jersey. Recently, after years of fruitless discussion, these communities have completed their plans for building a great trunk-sewer which should serve the affected districts, discharging its collected and unpurified contents into New York Bay near Robbins Reef. As soon as this intention became known, the Merchants' Association of New York filed protests with the Passaic Valley Sewerage Commission and gave notice of appeal against this pollution of inland waters to the States of New York and New Jersey and to the national government as well. Seeing that New York City discharges into the Hudson River and the harbor a vastly greater amount of sewage than can the New Jersey communities, the action of the protestants seems supererogatory and dog-in-the-mangerish. But the discussion has brought to light the interesting fact that, some forty years ago, the States of New York and New Jersey entered into a formal treaty by which the latter conceded to the former certain of the riparian rights and all of the duty of policing the shores and waters of the Hudson River and New York Bay. Evidently, then, New York is in excellent position to do an unneighborly act, if it is found to be best for her interests. Sanitarians will hope that the final outcome of the issue now joined will be the establishment by all communities concerned of proper purification-works.

WE hope that the report of the Audit Company of New York to the Pennsylvania Capitol Investigation Commission, which was submitted last week, may not prove too voluminous a document to reprint in full: it should afford very curious and interesting reading. Apparently there is evidence, in the way of drawings and documents, which seems to show that it was the intention of the manipulators to go on improving and furnishing the Capitol and grounds until the State had expended $32,000,000 for their benefit. It is difficult to decide which item of overcharge displays the greater ingenuousness, but perhaps the merits of the "per foot" rule are brought home in the most convincing way, when it is known that for 3,054 chairs—or the free air between their legs—the State paid $323,666.50.

A NEW application of the recommendation that there should be restored to Cæsar the things belonging to that gentleman has been made by Mr. C. C. Hoyer Millar, in connection with St. Paul's Cathedral. It is generally accepted as proved that the settling of that building that has taken place in the past and is still going on is due to the withdrawal of water in and below the site by the drainage and tunneling operations that have taken place in the neighborhood, and where a site is clayey such withdrawal of moisture is sure to cause settlings. Now, the cathedral foundations rest upon a six-foot layer of pot earth which overlies a deeper bed of loose sand, the London blue clay coming next below. Mr. Millar points out that not only the bed of pot earth has been drained from below, but that, owing to the paving of the streets and the building over of the neighboring territory, it has been deprived of the moisture that should naturally reach it from above through the percolation of the rainfall. He, therefore, proposes to restore the natural bearing qualities of the subjacent strata by artificially introducing over and through them the needed moisture. This he proposes to do by sinking at intervals, about the perimeter of the building and to a depth of forty feet, six-inch perforated pipes, closed at the bottom, from the lateral openings in which water may seep out into the now too-dry pot-earth and sand. The suggestion seems to have much logical value and it is not too costly an experiment to try here, as well as in other similar cases.

R. I. B. A. REPORT ON REINFORCED-CONCRETE.

A PROVISIONAL report of the committee consisting of Sir Henry Tanner, Messrs. Walmisley, Dunn, Max Clarke, Searles-Wood, Watson, Dru Drury, Greenwood, F. May, Collins, Cockrill, Colonel Mayne, Major Paul, Colonel Winn, Professor Unwin, Messrs. Colson and Marsh was presented at the meeting of the Royal Institute of British Architects, May 27, as follows:

1. REINFORCED-CONCRETE is used so much in building and engineering construction that a general agreement on the essential requirements of good work is desirable. The proposals which follow are intended to embody these essentials, and to apply generally to all systems of reinforcement. Good workmanship and materials are essential in reinforced-concrete. With these and good design structures of this kind appear to be trustworthy. It is essential that the workmen employed should be skilled in this class of construction. Very careful superintendence is required during the execution of the work in regard to—

(*a*) The quality, testing and mixing of the materials.

(*b*) The sizes and positions of the reinforcements.

(*c*) The construction and removal of centering.

(*d*) The laying of the material in place and the thorough punning of the concrete to insure solidity and freedom from voids. If the metal skeleton is properly coated with cement, and the concrete is solid and free from voids, there is no reason to fear decay of the reinforcement in concrete of stone, gravel, cinder, coke-breeze, etc., made with clean fresh water.

2. The by-laws regulating building in this country require external walls to be in brick or stone, or concrete of certain specified thicknesses. In some places it is in the power of the local authorities to permit a reduced thickness of concrete when it is strengthened by metal; in other districts no such power has been retained. We are of the opinion that all by-laws should be so altered as to expressly include reinforced-concrete amongst the recognized forms of construction. A section should be added to the by-laws declaring that when it is desired to erect buildings in reinforced-concrete complete drawings showing all details of construction and the sizes and positions of reinforcing bars, a specification of the materials to be used and proportions of the concrete, and the necessary calculations of strength based on the rules contained in this report, signed by the person or persons responsible for the design and execution of the work, shall be submitted to and approved by the local authority.

3. *Fire Resistance.*—(*a*) Floors, walls and other constructions in steel and concrete formed of incombustible materials prevent the spread of fire in varying degrees according to the composition of the concrete, the thickness of the parts and the amount of cover given to the metal.

(*b*) Experiment and actual experience of fires show that concrete in which limestone is used for the aggregate is disintegrated, crumbles and loses coherence when subjected to very fierce fires, and that concretes of gravel or sandstones also suffer, but in a rather less degree.[1] The metal reinforcement in such cases generally retains the mass in position, but the strength of the part is so much diminished that it must be renewed.

Concrete in which coke-breeze, cinders or slag forms the aggregate is only superficially injured, does not lose its strength, and in general may be repaired. Concrete of broken brick suffers more than cinder concrete and less than gravel or stone contrete.

(*c*) The material to be used in any given case should be governed by the amount of fire-resistance required as well as by the cheapness of, or the facility of procuring, the aggregate.

(*d*) Rigidly attached web members, loose stirrups, bent-up rods, or similar means of connecting the metal in the lower or tension sides of beams or floor slabs (which sides suffer most injury in case of fire) with the upper or compression sides of beams or slabs not usually injured, are very desirable.

(*e*) For main beams a covering of 1½ inch to 2 inches of concrete over the metal reinforcement appears from experience in actual fires to afford ample protection to the structural parts. In floor slabs the cover required may be reduced to 1 inch.

All angles should be rounded or splayed to prevent spalling off under heat.

(*f*) More perfect protection to the structure is required under very high temperature, and in the most severe conditions it is desirable to cover the concrete structure with fire-resisting plastering which may be easily renewed.

[1]The smaller the aggregate the less the injury.

Columns may be covered with coke-breeze concrete, terra-cotta, or other fire-resisting facing.

MATERIALS.

4. *Cement.*—Only Portland cement complying with the requirements of the specification adopted by the British Engineering Standards Committee should be employed; in general the slow-setting quality should be used. Every lot of cement delivered should be tested, and in addition the tests for soundness and time of setting, which can be made without expensive apparatus, should be applied frequently during construction. The cement should be delivered on the work in bags or barrels bearing the maker's name and the weight of the cement contained.

5. *Scnd.*—The sand should be composed of hard grains of various sizes up to particles which will pass a ¼-inch square mesh, but of which at least 75 per cent. should pass ⅛-inch square mesh. Fine sand alone is not so suitable, but the finer the sand the greater is the quantity of cement required for equal strength of mortar. It should be clean and free from ligneous, organic or earthy matter. The value of a sand cannot always be judged from its appearance, and tests of the mortar prepared with the cement and the sand proposed should always be made. Washing sand does not always improve it, as the finer particles which may be of value to the compactness and solidity of the mortar are carried away in the process.

6. *Aggregate.*—The aggregate, consisting of gravel, hard stone or other suitable material, should be clean and angular, varied in size as much as possible between the limits of size allowed for the work. In all cases, material which passes a sieve of a ¼-inch square mesh should be reckoned as sand. The maximum allowable size is usually ¾ inch. The maximum limit must always be such that the aggregate can pass between the reinforcing bars and between these and the centering. The sand should be separated from the gravel or broken stone by screening before the materials are measured.

7. *Proportions of the Concrete.*—In all cases, the proportions of the cement, sand and aggregate should be separately specified in volumes. As the strength and durability of reinforced-concrete structures depend mostly on the concrete being properly proportioned, it is desirable that in all important cases tests should be made as described herein with the actual materials that will be used in the work before the detailed designs for the work are prepared. In no case should less dry cement be added to the sand when dry than will suffice to fill its interstices, but subject to that the proportions of the sand and cement should be settled with reference to the strength required, and the volume of mortar produced by the admixture of sand and cement in the proportions arranged should be ascertained.[1] The interstices in the aggregate should be measured and at least sufficient mortar allowed to each volume of aggregate to fill the interstices and leave at least 10 per cent. surplus. For ordinary work, a proportion of one part of cement to two parts sand will be found to give a strong, practically water-tight mortar, but where special water-tightness or strength is required the proportion of cement must be increased. The amount of cement added to the aggregate should be determined on the work by weight. The weight of a cubic foot of cement for the purpose of proportioning the amount of cement to be added may be taken at 90 lbs.

8. The metal used should be steel having the following qualities:

(*a*) An ultimate strength of not less than 60,000 lbs. per square inch.

(*b*) An elastic limit of not less than 50 per cent., or more than 60 per cent. of the ultimate.

(*c*) An elongation of not less than 22 per cent. in the lengths stated below.

(*d*) It must stand bending cold 180 degs. to a diameter of the thickness of pieces tested without fracture on outside of bent portion.

In the case of round bars the elongation should not be less than 22 per cent., measured on a gauge-length of eight diameters. In the case of bars over 1 inch in diameter the elongation may

[1]For convenience on small works the following figures may be taken as a guide, and are probably approximately correct for medium silicious sand:

Parts Cement.		Parts Sand.		Parts Mortar.
1	plus	½	equals	1.20
1	plus	1	equals	1.50
1	plus	1½	equals	1.90
1	plus	2	equals	2.35
1	plus	2½	equals	2.70
1	plus	3	equals	3.00

be measured on a gauge-length of four diameters and should then be not less than 27 per cent. For other sectional material the tensile and elongation tests should be those prescribed in the British Standard Specification for Structural Steel. Before use in the work, the metal must be clean and free from scale or loose rust. It should not be oiled or painted, but a wash of thick Portland-cement grout is desirable. Welding should, in general, be forbidden; if it is found necessary, it should be at points where the metal is least stressed, and it should never be allowed without the special sanction of the architect or engineer responsible for the design. The reinforcement ought to be placed and kept exactly in the positions marked on the drawings, and, apart from any consideration of fire-resistance, ought not to be nearer the surface of the concrete at any point than 1 inch in beams and ½ inch in floor-slabs or other thin structures.

9. *Mixing: General.*—In all cases the concrete should be mixed in small batches and in accurate proportions, and should be laid as rapidly as possible.

Hand-mixing.—When the materials are mixed by hand they are to be turned over and thoroughly mixed on a clean platform until the color of the cement is uniformly distributed over the aggregate.

Machine-mixing.—Whenever practicable, the concrete should be mixed by machinery.

10. *Laying.*—The thickness of loose concrete that is to be punned should not exceed 3 inches before punning, especially in the vicinity of the reinforcing metal. Special care is to be taken to insure perfect contact between the concrete and the reinforcement, and the punning should be continued till the concrete is thoroughly consolidated. Each section of concreting should be as far as possible completed in one operation; when this is impracticable and work has to be recommenced on a recently laid surface it is necessary to wet the surface, and where it has hardened it must be hacked off, swept clean and covered with cement grout. Work should not be carried on when the temperature is below 34 degs. Fahr. The concrete when laid should be protected from the action of frost, and shielded against too rapid drying from exposure to the sun's rays or winds, and kept well wetted. All shaking and jarring must be avoided. The efficiency of the structure depends chiefly on the care with which the laying is done.

Water.—The amount of water to be added depends on the temperature at the time of mixing, the materials and the state of these and other factors, and no recommendation has therefore been made. Sea-water should not be used.

11. *Centering or Casing.*—The centering must be of such dimensions and so constructed as to remain rigid and unyielding during the laying and punning of the concrete. It must be so arranged as to permit of easing and removal without jarring the concrete. Provision should be made wherever practicable for splaying or rounding the angles of the concrete. Timber when used for centering may be advantageously limewashed before the concrete is deposited.

12. *Striking of Centres.*—The time during which the centres should remain up depends on various circumstances, such as the dimensions or thickness of the parts of the work, the amount of water used in mixing, the state of the weather during laying and setting, etc., and must be left to the judgment of the person responsible for the work. The casing for columns, for the sides of beams and for the soffits of floor-slabs of not more than 4 feet span must not be removed under eight days; soffits of beams and of floors of greater span should remain up for at least fourteen days, and for large-span arches for at least twenty-eight days. The centering of floors in buildings which are not loaded for some time after the removal of same may be removed in a short time; the centering of structures which are to be used as soon as completed must remain in place much longer. If frost occurs during setting, the time should be increased by the duration of the frost.

13. *Testing.*—Before the detailed designs for an important work are prepared, and during the execution of such a work, test-pieces of concrete should be made from the cement, sand and aggregate to be used in the work, mixed in the proportions specified. These pieces should be either cubes of not less than four inches each way, or cylinders not less than four inches diameter and of a length not less than the diameter. They should be prepared in moulds and punned as described for the work. Not less than four cubes or cylinders should be used for each test, which should be made twenty-eight days after moulding. The pieces should be tested by compression, the load being slowly and uniformly applied. The average of the results should be taken as the strength of the concrete for the purposes of calculation, and in the case of concrete made in proportions of 1 cement, 2 sand, 4 hard stone, the strength should not be less than 2,400 lbs. per square inch.

Loading tests on the structure itself should not be made until at least two months have elapsed since the laying of the concrete. The test load should not exceed one and a half times the accidental load. Consideration must also be given to the action of the adjoining parts of the structure in cases of partial loading. In no case should any test load be allowed which would cause the stress in any part of the reinforcement to exceed two-thirds of that at which the steel reaches its elastic limit.

Suggestions are also given in the report about methods of calculation, with papers by Professor W. C. Unwin and Mr. W. Dunn.

UNDERWRITING AND OTHER TERMS.[1]—I.

THE work outlined for the Committee on Uniformity of Requirements during the past year was the preparation of a glossary of insurance words and terms, especially those which either are not defined at all in the standard dictionaries and encyclopedias, or, being defined, have definitions which are not especially fit when applied to usage in the fire-insurance business.

To this end the Committee presents some 170 definitions for your consideration, of which number practically all pertain to engineering or technical matters, but little attention having been given to Underwriting terms.

The Committee fully realize that many of the definitions are open to criticism, since members are not and probably never will be unanimous in their opinions concerning same, and suggest that such definitions be omitted entirely if their inclusion will cause extended discussion, and especially if at the end of such discussion there may in all probability be many unwilling to subscribe to the amended definitions.

GLOSSARY.

A.

"*Air Shaft.*"—A duct usually vertical, but not necessarily so, enclosed in any material, for the passage of air either by natural or artificial draft. See "ventilating shaft."

"*Aligned*" or "*Alined.*"—Set in line, said of shafting which is set properly and runs true in its bearings.

"*Astragal.*"—A projection on the edge on one fold of a door, sash or shutter to fit into a corresponding groove in the other fold.

B.

"*Back-draft.*"—A reversal of the draft of a fire in a boiler or furnace. It is generally due to the accumulation of unignited gas in the furnace or boiler flue from imperfect combustion or temporary choking caused by expansion, wind, sudden atmospheric changes, etc.

"*Book-tile.*"—A roof tile shaped like a book in that the ends are square, one edge concave and the other convex.

"*Breeching.*"—The connecting flue, generally of iron, between a boiler or furnace and its stack; a smoke or heat flue; an uptake.

"*Bus-bars, rods or wires.*"—The wires, bars or rods from which the various transmission circuits of an electric power distribution system are supplied, and to which the leads from the generators (or other sources of power) are connected for convenience of control. Usually applied to the main conductor of an electric switchboard.

"*Bushing.*"—

(a)—Electricity, an insulating sleeve or collar about a wire or conductor.

(b)—A male-and-female threaded fitting used with wrought-iron pipe for making connection between two different sizes of pipe.

C.

"*Cap.*"—

(a)—A top member of a column or the protecting top of a post or wall.

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[1]Report of the Committee on Uniform Requirements submitted at the annual convention of the National Fire Protection Association, May, 1907.

(b)—A pipe fitting provided with a female thread for closing or stopping the end of a line of pipe.

(c)—The screwed cover of a chemical extinguisher.

(d)—The upper half of a journal box.

"Casement Stay."—A bar or other device for holding a window sash open.

"Ceiling Light."—A glazed sash in a ceiling, usually under a skylight.

"Choke Coil."—A coil of wire, wound in one direction, of very small resistance but large inductance; used to reduce the voltage and throttle the flow of current without the loss of power which follows the use of resistance.

"Circuit-breaker."—

(a)—A mechanical device for breaking a circuit.

(b)—An electrical device, manual or automatic, for interrupting completely the flow of current in a circuit, and capable of being restored to the closed position without damage or change in the device itself other than that due to wear and tear.

"Clearance."—

(a)—Distance between two or more objects, as applied to separation of the heated portion of any device from woodwork or other fixed inflammable material; may be further designated as side, bottom or overhead clearance.

(b)—As applied to machinery, the distance between any two or more moving or stationary parts which the action of adjustment of the machine permits.

"Clear Span."—Distance between end supports; a truss supported only at ends is said to have clear span.

"Compensator."—

(a)—Used with A. C. motors. A type of transformer in which the secondary winding is a continuation of the primary winding; suited to use on low potential circuits and most commonly found as the starting device of induction and synchronous motors. When one of the secondary terminals of a compensator is arranged so that the position of its connection to the winding may be varied the device is called an auto-transformer.

(b)—Voltmeter. A device used in connection with voltmeters to show pressure at the center of consumption without the use of pressure wires running to that point; or an arrangement of transformers, an inductance coil, and a resistance coil in the main feeder and voltmeter circuits so that the voltmeter will read the pressure at the outer end of the feeders—the point where current is consumed.

(c)—Three-wire system. A term applied to two auxiliary electric machines built to operate either as motors or generators, coupled together and having outside leads connected to the outside wires of the 3-wire system with inside leads common to neutral wire. They serve to equalize the load on the two sides of the system, the one on the lightly loaded side running as a motor driving the other on the heavily loaded side as a generator.

"Construction."—

(a)—"Compromise Mill." A form of construction which, in the main, conforms to the standard for mill construction, but which may be sub-standard in having concealed spaces, unprotected steel, light combustible partitions, floor openings, small timbers, or deficient floors, or roof, etc.; in case these defects are present in sufficient numbers a "compromise mill" constructed building may not be classed as "slow-burning"; also spoken of as semi-mill construction.

(b)—"Crib." Made of superimposed planks laid flat, with broken joints, and spiked together.

(c)—"Fireproof." Literally proof against the effects of fire. In reality nothing is absolutely fireproof. Fireproof construction is popularly recognized as consisting of incombustible materials such as stone, brick, terra-cotta, tile or concrete, etc., with or without a steel framing, assembled in such a manner that it cannot burn or add fuel to burning contents.

(d)—"Iron-on-studding." A style of construction in which corrugated or sheet iron is fastened directly on studding or scantling; differing from iron-clad in that the latter form of construction has the metal fastened to sheathing, which in turn is fastened to studding.

(e)—"Mill." Originally applied to buildings of heavy timber with floors and roofs of thick plank and walls at least 12 inches thick in top story and increasing in each story below, no floor openings, no concealed spaces, no light combustible partitions and all exposed openings protected. The modern standard mill-constructed building for mercantile and factory purposes often differs from the above in having protected cast-iron or steel posts with stairs, elevators, etc., in brick shafts and protected openings to floors. It should be noted that standards for mill construction vary in different sections of the country. See "slow-burning," "semi-mill" and "Pittsburg" construction.

(f)—"Pier-and-panel." Applied to wall construction in which the main weights are carried on piers between which thinner walls are built.

(g)—"Pittsburg." A type of slow-burning construction in which the floors are formed by planks laid on edge and spiked together.

(h)—"Slow-burning." Any construction, not fireproof, which has been rendered slow-burning either by its massiveness or by the use of fire retardents. Commonly spoken of synonymously with mill or Pittsburg construction, which see.

(i)—"Semi-mill." See compromise mill.

(j)—"Skeleton Steel." Consisting of a framework or skeleton of steel which carries all loads.

"Country Risk."—A risk located outside of a city, town or village and not under protection of any public fire-fighting apparatus.

"Cut-off."—A local fire-stop, such as a brick wall with protected openings between different sections of a building. Combustible or lightly constructed incombustible partitions are not regarded as cut-offs, although acting to a certain extent as fire-stops. See "wall," "fire."

"Cyclone-collector."—A dust collector shaped like the inverted frustum of a cone, or ogee-shaped, generally of iron and depending upon gravity and centrifugal force to separate the dust from the air containing it, with a vent at the top, another at the bottom and an intake near the top for the dust-laden air, which is blown in and circles around, dropping the dust and itself escaping through the top vent.

D.

"Door" or *"Doors."*—

(a)—"Batten-door." A door made of narrow boards held together by means of cross battens nailed to them (*"Century"*). A term misused in the insurance business, in which *batten* is taken to mean the principal boards of a built-up wooden door.

(b)—"Double." A single door on both sides of an opening.

(c)—"Double-hung." Doors with two methods of suspension, either one or both of which may support the doors, usually found only on large openings; a common form is known as "jack-knife," in which two doors are hinged together, the upper door being also hinged to the head of door-frame or to wall, the lower edge of lower door being held to wall by rollers in guides at sides.

(d)—"Double Swinging." A pair of doors hung one on each side of a doorway; also improperly called "folding doors."

(e)—"Folding." Two or more doors on one side of an opening, one of which is hinged to the jamb or door-frame and swings back against the jamb or wall, the second door being hinged to the first, the third to the second, etc., and swinging into place as does the first; the combination is frequently spoken of as one door, each division being termed a leaf, in which case, if the door has two divisions, it would be termed a two-leaf folding door, etc. Also applies to iron shutters.

(f)—"Sash-door." A door having the upper portion formed like a sash.

(g)—"Single." A single door on one side only of an opening.

"Drip-loop."—The downward bend or loop in an electric wire just before it enters a building, to prevent moisture from following the wire in; sometimes called a rain-loop.

"Dry-pipe System."—An automatic sprinkler system for protection of unheated buildings, in which the sprinkler pipes are kept under air pressure, this air pressure acting through the medium of a dry-pipe valve to hold back the water supply until one or more heads may open, when water is automatically admitted through the dry-pipe valve by the release of compressed air from the fused sprinklers.

E.

"Elevator-boot."—The lower pulley of an elevator and its enclosure of wood or iron.

"Elevator-head."—The pulley or pulleys driving a bucket-belt and its enclosure of iron or wood.

"Elevator-leg."—The enclosed channel in which a bucket-belt travels between the head and boot.

"Exposure."—

(a)—Anything detached from a risk which, through its inflammability, explosibility or other qualities, may create fire-loss in the risk exposed.

(b)—Features of exterior construction which may aid in the introduction of or spread of fire in a risk; as wooden cornices and awnings, frame-roof houses, light exterior walls, unprotected openings, frame additions, etc.

F

"Fan-light."—A window containing a sash with bars radiating from the middle of its base like the spokes of a fan.

"Fire Division."—Not a common term. See "wall," "fire."

"Fireproofing."—Materials used in buildings to protect metal members from heat; generally consists of tile, terra-cotta, brick or concrete.

"Fire-retardant."—A substance or device capable of retarding but not necessarily preventing the progress of fire.

"Fire-resistive."—Having the power to resist fire. A weaker term than "fireproof," inasmuch as any material is fire-resistive to a greater or lesser degree.

"Flasher."—A device, generally rotating, for throwing in and out the circuits to the lights of intermittent electric signs.

"Flat Arch."—A form of masonry construction in which each unit is in compression and the lower surface of which is straight.

"Floor-light."—Glass set in a floor for transmitting light to space below.

"Folding Shutter."—See "doors, folding."

"Frame."—

(a)—The skeleton woodwork or metal-work of a structure.

(b)—Anything constructed of wood; as a frame shed, a frame wall, a frame bin, etc.

(c)—A door frame or window frame.

"Framing."—Framework; a structure or frame for supporting or enclosing anything, or to be the basis of a more complete structure.

"Friction Elevator-Head."—A small paper friction roller or pulley keyed to the main shaft and rotating against the periphery of a large iron pulley which drives the bucket-belt.

"Furring."—Strips nailed to walls or beams to serve as a foundation for laths, sheathing, etc.

"Fuse."—An electric device, consisting of a connecting link, strip, plate or bar, enclosed or unenclosed, designed to fuse at a certain predetermined temperature and thus break or open the circuit, preventing loss from overload to the apparatus protected.

(a)—"Cartridge." One in which the fusible portion is surrounded by asbestos or other non-inflammable material and enclosed in a cylindrical shell, resembling a gun cartridge shell.

(b)—"Open Link." One in which the fusible portion is bare.

(c)—"Plug." One in which the fusible portion is enclosed in a porcelain-filled metallic plug.

Any of the above types may be, and in some localities are required to be, placed in standard cabinets.

G.

"Glass Slate."—A piece of rough plate glass, used like a slate for roof covering where light is required.

"Gridiron."—The slatted floor, either of wood or iron, or both, over a theatre stage which supports the numerous pulleys for operating the scenery.

H.

"Hard Sprinkler-heads."—Automatic sprinkler heads which fuse at a temperature exceeding 165 degrees F.; also known as high-degree or high-test heads; used over boilers, in dry-kilns or other places where the temperature is normally so high as to fuse ordinary heads.

"Hazard."—

(a)—"Moral." The danger of loss from fire either by intentional or careless neglect of physical hazard, or by arson. Some causes of moral hazard:—Poor trade conditions, business jealousy, enemies, pyromaniacs, decrease of raw products, panics, etc.

(b)—"Physical." Anything which possesses originally or which through deterioration or other natural causes, carelessness or neglect, may become possessed with the power to cause fire, or which unduly influences the rapid spread of fire, or which in any way affects disadvantageously any feature of protection.

"Head."—

(a)—In masonry, a long stone over a door or window opening; a lintel.

(b)—In carpentry, the horizontal piece at the top of a quarter partition or door frame.

(c)—In slating, the upper part of a slate.

(d)—In iron-work, the enlarged end of a bolt.

(e)—The funnel generally placed at the top of a rain-water pipe.

(f)—The vertical height to which water will rise in a pipe under any given pressure.

(g)—The top horizontal piece of a window or door frame.

(h)—In automatic sprinkler equipments, the device designed to release water from a pipe to quench a fire.

"High-degree Thermostats."—Thermostats which operate at a temperature exceeding 160 degrees F. See "hard sprinkler heads."

(To be continued.)

BELGIAN ARCHITECTURE.

IN 1814, when there was a partition of some parts of Europe, it was a difficulty to decide the fate of Belgium. If it were not through fear of the growing influence of Prussia, it would now have belonged to that country, a circumstance which is remembered in Berlin. England insisted on it being separated from France. Austria knew by experience the impossibility of ruling it. Finally Belgium was incorporated with Holland.

The fate of the country at that time was curiously suggestive of many features of Belgian art. The peculiarities of the Dutch painters were easily imitated by Belgian painters. A Belgian *Kermesse* by Rubens does not differ much from one of the crowds of Dutchmen which were so often represented in Holland. Teniers and Brauwer, who were Flemings, are often supposed to be Dutchmen. On the other hand, the influence of French building was most marked. Indeed it might be said that the art of Belgium in general swayed between its northern and southern neighbors. Since 1830 Holland has lost its influence with Belgian artists, while France has gained much of its old supremacy among them.

The Dutch Government were well aware of the task before them in dealing with their new possession. Three months exactly after the fate of the French Emperor had been finally decided at Waterloo an order was issued that the Dutch language was to be the official tongue of Belgium. Language is closely linked with liberty and much else, and although they were such near neighbors few of the educated classes of Belgium could express themselves in the dialect of Holland. The consequence was that not only in the Cabinet Councils but in all Government departments Belgians were in a ridiculous minority. Out of thirty-nine diplomatists only nine were Belgians. In the Home departments there were eleven Belgians to 106 Dutchmen. There were six times as many Dutch commissioned officers in the army as Belgians. The Supreme Court was at The Hague, and litigants had to travel there from all parts of Belgium. As was to be expected, the Belgians conspired, and the success of the Paris Revolution of 1830 caused an uprising in Brussels. The Dutchmen very wisely did not make much difficulty about a separation.

Although the Belgians might not be considered by men of the Fergusson class as essentially artistic, yet after they became independent they set about building with an enthusiasm that recalled Mediæval times. We must remember that the people in those days looked upon their freedom from Dutch officialdom as a blessing from heaven. In consequence, the revolution was barely ended when they began to erect parish churchs and convents. The majority were more or less Renaissance in character. The adoption of the style was remarkable, and suggested southern influence. . . . Some churches were erected in the Gothic style, while in others a sort of Romanesque was preferred, partly because wall-painting was exercised by several artists, and large panels for the display of religious pictures were considered a necessity.

The skill exhibited by the painters produced an unanticipated effect in architecture. The most precious treasures possessed by Belgium are the town-halls. In no other country of Europe are

such memorials to be found of the power of burghers. After the Revolution of 1830 several of the most ardent painters devoted themselves to national subjects. It then became manifest to the humblest peasant that, in spite of the anomalies of the Government of the country in the past, Belgium had then a history of which the people should be proud. Several of the town-halls were decorated with paintings which helped to explain historic incidents which occurred in their vicinity. So much success attended those efforts, it was but a step to the revival of Belgian architecture, not only for new municipal buildings, but for banks, business establishments and private residences. Some of them may appear allied to examples in Holland, but in the best work there are features which are distinctly Belgian. The increased interest which quarrying obtains has revealed the existence of a marvelous variety of building stones, and the architect has therefore at his command materials which are adapted to all necessities. In fact, there is no country in Europe in which there seems to be a more hopeful likelihood of a national style, in which Renaissance elements will be fused into compositions which can recall the peculiar position of Belgium as a country which was closely related to many foreign nations. It is possible that desire may again arise for a style which will be more distinctly French, but at the present time the native style enjoys most favor.—*The Architect.*

Rear View, House of Mr. J. C. Green.

Dining-room Fireplace, House of Mr. J. C. Green

ILLUSTRATIONS

HOUSE OF MR. JAMES C. GREEN, ARCHITECT, GREENWICH, CONN.: SIX PLATES.

Main Entrance, House of Mr. J. C. Green.

HOUSE OF MR. EDWARDS, KINGSBURY ROAD, ST. LOUIS, MO. MESSRS. MAURAN, RUSSELL & GARDEN, ARCHITECTS, ST. LOUIS, MO.

COTTAGE OF C. P. BYRNES, ESQ., SEWICKLEY, PA. MR. CHARLES BARTON KEEN, ARCHITECT, PHILADELPHIA, PA.

Additional Illustrations in the International Edition.

DETAILS: HOUSE OF MR. JAMES C. GREEN, ARCHITECT, GREENWICH, CONN.: TWO PLATES.

Billiard-room Fireplace, House of Mr. J. C. Green.

HOUSE OF MR. J. C. GREEN, ARCHITECT, GREENWICH, CONN.

The building is founded on solid rock and the walls are of the local stone, with dark blue and red brick about the openings.

For insulation and interior finish a layer of sheathing quilt is placed next the interior surface of the walls, which are then furred and plastered. Terra cotta ornamentation, designed by the architect, is sparingly used in the exterior—for example, in the skewbacks for brick arches. The roof is of Spanish tiles.

All stairways and the floors of corridors, halls, servants' quarters, kitchen and laundry are of asbestolith, molded in so-called sanitary forms, i. e. without sharp angles. The living room is floored with stained birch and most of the other principal rooms with dark red vitrified tile, which material is also used for porch and terrace floors.

The main entrance is under the porte cochère to the left. On the right of the porte cochère is the entrance to the rooms reserved as the owner's offices. Staircase, halls and corridors are panelled in wood, covered with a dull gold Chinese paper. This paper was applied before the wood was thoroughly seasoned, and the shrinkage of the wood has accidentally produced a crinkling of the paper which gives an interesting surface.

The entrance hall and billiard-room are trimmed with cypress, stained dark and waxed; the walls of the latter are covered with a Japanese leather paper of lustrous dark green; the ceiling is of wood laid in lozenge-shaped panels. In the dining-room the woodwork is of chestnut, worked out by hand tools. The library is lined with bookcases glazed with leaded glass; the windows in this room are also of leaded glass, in which old printer's marks are used as the motive for ornament.


Fireplace in Entrance-hall: House of Mr. J. C. Green, Architect.

The tower, which affords a splendid view for many miles around, has at its top a large chamber, open on all sides and designed for use during extremely warm weather as a sleeping chamber. This room is protected from the weather by glazed casements, which fold into recesses.

Servants' quarters are arranged in an extension over the laundry running out from the main building.

A feature of the kitchen is its hygienic arrangement, the room being constructed on lines similar to those employed in a hospital. The walls are of vitrified brick. A high stone wall, capped with red tile, makes a view into the garage and the adjoining stable from any part of the house an impossibility. On the other side of the stable, away from the house and opening out from the men-servants' quarters, is a wide balcony exclusively for their use and convenience. The garage is built to store two cars, and has a tank for gasoline located some thirty feet outside the building. This garage has also three roms for men servants, and a bath and toilet room. The stable has four single and two box stalls, with large carriage rooms and harness closets.

NOTES AND CLIPPINGS

Hackwood Park, Hampshire.—The present mansion was designed by Inigo Jones. Among its most famous mistresses was Lavinia Fenton, wife of the third Duke of Bolton, who had married her from the stage, where she had created the rôle of Polly Peachum, in Gay's "Beggars' Opera," and the French garden at Hackwood has a beautiful marble-paved room which was specially constructed for her as a music-room. One part of the grounds is known as Springwood, and there ivy grows as it pleases and hangs in long festoons from the tops of the beech trees. On the other side of the grounds is a large amphitheater, where *al fresco* theatrical entertainments have often been held. It is walled in with great elms, has a turf floor for a stage and tiers of grassy seats for the audience. The mansion is celebrated for many splendid carvings by Gibbons, and in front of the house is a statue of George I on horseback, which that monarch presented to the Duke of Bolton of his day, who had been his friend and confidant prior to his accession to the throne of England. Another present of King George's was a couple of superb marble pillars, which had originally been sent by the Duke of Tuscany to Charles II.—*Marquise de Fontenoy, in N. Y. Tribune.*

Germans Reclaiming the Campagna.—If the Germans can succeed in their enterprise of reclaiming the Campagna di Roma, it will be a victory which will give them a still higher place in Europe. Charles Dickens did not exaggerate when he described it as the fittest burial-ground for the Dead City:—"So sad, so quiet, so sullen; so secret in its covering up of great masses of ruin and hiding them; so like the waste places into which the men possessed with devils used to go and howl and rend themselves in the old days of Jerusalem." The Campagna has an area of about 1,400 square miles, and the formation is mainly volcanic. At one time a large number of people lived on it. But when, in the early days of the Roman Empire, the nobles were allowed to divide the territory into immense estates, ruin seized it. Under the Popes many efforts were made to reclaim the Campagna, and in consequence parts were utilized without much danger. But the great plain requires to be treated as a whole, and that was a task which was impossible in any of the preceding ages. It remains to be seen whether the German syndicate will be more successful than the Emperors and Popes who attempted to grapple with the difficulty. The plans prepared by Colonel Donath, an engineer officer, propose the excavation of a connected series of water-courses, which will all trend towards the sea. There are already some rivers, but they are not sufficiently looked after, and the obstructed courses overflow. The soil is not absorbent, and in consequence marshes are formed which become a perennial source of miasma. The works of the Panama Canal appear to be easy in comparison with those required for the reclamation of the Roman Campagna. If the aim of the projectors could be accomplished not only would an immense area of cultivated land be produced, but Rome would enter on a new historical period, for people could live there without apprehension of the dangers which centuries of neglect have created, and in this way unanticipated prosperity would follow for the ancient city.—*The Architect.*

The Hardness of Tantalum.—Tantalum has been hammered into sheets which are extremely hard. Sir William Crookes, F. R. S., states that "a hole had to be bored through a plate of this metal and a diamond drill was used, revolving at the rate of five thousand revolutions per minute. This whirling force was continued ceaselessly for three days and nights, when it was found that only a small depression, .25 millimetre deep, had been drilled, and it was a moot point which had suffered the more damage—the diamond or the tantalum."—*Scientific American.*

Ground Rental "One Red Rose."—Hundreds of persons visited the little town of Manheim, June 9, to witness the quaint ceremony of the Feast of Roses. In 1772 Baron Henry William Stiegel, founder of the town, deeded to Zion Lutheran Congregation the ground upon which their church stands, in consideration of an annual rental of "one red rose, payable in June, when the same shall be lawfully demanded." Twice in the lifetime of Baron Stiegel payment was demanded and made. Then the custom fell into disuse until it was revived recently.—*Exchange.*

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SOCIETIES, PERSONAL MENTION, ETC.

THE New York *Evening Post* finds it worth while to devote a long editorial article to commending and commenting on a suggestion contained in the June issue of the Columbia University *Quarterly*, which draws attention to the fact that a system of academic coöperation between the universities and colleges of this country, one that could easily be devised and established, lies comparatively overlooked and unused. The observations of both of these authorities are quite in line with the suggestion we made in our issue for January 15, 1905, when we pointed out some of the advantages that might accrue to the architectural schools, and the profession, through the organization of what we then styled "a peripatetic American Sorbonne," selected members of the teaching-staff lecturing in rotation at the several architectural schools during the same semester, to the manifest broadening of the influence of their teaching and the lightening of their own mental labors. The real credit for the suggestion in all the cases dates back, of course, to Kaiser Wilhelm II. or whoever it was that suggested to him the establishment between Germany and the United States of an exchange of lecturing professors. It may be worth while for those who are interested in our architectural schools to look up what we said on the subject a couple of years ago.

ANOTHER, and a seemingly needed lesson in fire-proofing was given in New York the other day in a rather spectacular fashion. A fire occurring in the eighth story of a modern building, the first fire-engine to arrive on the scene coupled onto the stand-pipe of the building while the hosemen were carried by the elevator to the floor above the fire, where they unrolled the stationary hose belonging to that floor and opened the valve. But, in place of the gush of water they were prepared for, there issued with explosive violence from the pipe's nozzle a volume of superheated steam that caused every scalded fireman it struck to wilt and drop, while the hands of the man who held the nozzle were badly blistered before he could drop it. The explanation of the phenomenon was found to be that the stand-pipe passed through that room where the fire was, and here the most combustible goods, and so causing the hottest fire, chanced to be stacked about the empty stand-pipe, which was in consequence quickly raised to white heat. Consequently, when the water had been forced by the fire-engine up to that point where it touched the heated metal, it at once flashed into steam with explosive violence. But for the almost simultaneous opening of the hose valve, the explosion would, apart from injury to the firemen, probably have wrecked walls and floors enough to allow the further spread of the fire. The accident, serious so far as the men were concerned, shows that where stand-pipes must be carried through store-rooms or offices they should be carefully protected with a good cellular fireproof covering, while the tenants should be warned to keep goods at a distance.

WHEN in responding to a reporter's invitation to talk about oneself a man does so, it is not fair to class him as an egoist, but it does seem quite proper to infer, from the tale confided to his newspaper friend, that Mr. George Gray Barnard, sculptor, while a good deal of an optimist, with possible altruistic tendencies, is surely a very credulous person, and rather a poor hand at affairs. Mr. Barnard has returned to this country to try to straighten out his obligations and rights under his contract to provide for the Pennsylvania Capitol certain important sculptures, important in scale, but even more impressive, Mr. Barnard thinks, in number, for, whereas Michael Angelo sculptured only nineteen figures during his whole career—leaving some of them unfinished at that—the American sculptor sought to do for the Pennsylvania State-house no less than sixty-seven, one of the groups being forty-five feet high. It appears, though, that we, like other of the sculptor's admirers, have been in error in believing until now that he had agreed to model and deliver, in stone or bronze, the entire amount of work originally considered for the paltry sum of one hundred thousand dollars. Mr. Barnard proves to have been, so far as knowledge of business forms and acquaintance with human nature, quite as innocent as most artists, but it seems that he cannot be charged with ignorance of a fair valuation for the work he was undertaking to do, for he now says he was told by the Commissioners and their architect that he would "without doubt have seven hundred thousand dollars with which to do the work." Later, the Commission declared they could only spend three hundred thousand for sculpture, and that it must all be delivered in three years. When the sculptor declared this would be impossible, they finally made a contract

with him for about one-third of the work originally contemplated, binding themselves to pay one hundred thousand dollars, provided the finished groups should be delivered within the specified three years. As everyone knows now, the sculptor has not been able to make delivery, and has received only some sixty thousand dollars on account. He now returns to this country in the hope of procuring a revision and renewal of the contract and enough money to enable the completion of the work already in hand.

THE irritations to which a constitutional monarch is subjected must be very annoying to an autocratic spirit, and King Leopold, already chafing under the impolite way in which Christian civilization is inquiring into the conduct of affairs in the Congo Free States, can hardly relish the way in which he has been brought to book in the capital city of his own kingdom, though, to be sure, he already knew he was not over-popular there. It appears that for some time past the royal palace at Brussels has been undergoing serious reconstruction, and a short time ago some busybody noticed that the builders were encroaching on the public thoroughfare whereon the palace abuts, and at once filed a complaint with the municipal bureau of inspection of buildings. The builder, entertaining the belief that a king can do no wrong, declined to comply with the order of the municipal authorities, and went on with his work, only to be arrested promptly. This brought the undertaking to a standstill, and, as the King is so unpopular, the result is likely to be that he cannot obtain from the city any waiver of the ordinances, and this will mean that not only work already done must be undone, but the entire design of the façade at that point will have to be redesigned. If the citizens of Brussels can force the wealthiest monarch in Europe to respect the law, it should encourage the Corporation Counsel of New York City to insist on the removal of the encroaching portions of the Knickerbocker Trust Company's building and other similar structures along Fifth Avenue, and even to attack the property, on the Riverside Drive opposite the Soldiers' Monument, of the lady who is making herself prominent just now by her conduct of a campaign against needless noise, the particular object of her attack being the skippers of tug-boats and steamers who navigate the Hudson in front of her dwelling.

THE destruction that overtook the French forests after the Revolution, when the great landed estates of the *émigrés* fell into the hands of the populace, has seemingly been repeated in Japan. When, in 1871, feudalism was abolished and the *daimios* surrendered their powers and privileges, together with more or less of their land holdings, to the Mikado, some of this land was retained by the Government, while other parts were disposed of to private parties. These new owners, anxious to reap a speedy return, attacked the standing timber with reckless indiscretion, and, though but few years have elapsed, the country is already suffering. In view of this the Government lately has taken steps to encourage tree-planting; in other words, it seems to have revived one of the standing laws of the feudal code, which required the planting of a new tree whenever an old one was felled. In our own Northwest, Minnesota, which has an enlightened Forestry Service, pays out this month in the forty-two counties which have adopted the bounty system, the sum of twenty thousand dollars, at the rate of $2.30 per acre, though an owner can collect in one year bounty on only ten acres. This provision has its usefulness, for it not only sets a limit on the amount a county must raise by general taxation to pay the tree-planting bounty, but it discourages the planting of a greater area than can be cared for by the owners, it being one of the provisions of the law that any tree that dies must be replaced.

AS the editors of *The Iron Age* and the *Journal of the Franklin Institute* are normally efficient proof-readers, it would apear that, henceforward, architects might have to be more particular than ever as to the dotting of their i's. The latter editors appear to endorse the former's statement that "alumenum," a steel plate coated with it does not appear what, has most useful qualities, seeing that the sheets are rustproof, do not scale under double-seaming and can be soldered freely. Alumenum is intended for such uses as are now satisfied by sheet copper or galvanized iron sheets, and in point of cost and durability is said to rank between these two older and better known materials. If the advent of the new material will but restore to general use in the language the more logical and elegant spelling of the light metal, aluminum, it should be welcomed for that reason alone.

AND, speaking of words, we have lately, in an Iowa newspaper, come upon a familiar word used in an unfamiliar way—the writer there declaring that a certain house has been repainted "from comb to baseboard." We do not pretend to know the derivation, but the analogy between a ridge-pole and a cock's comb is sufficiently plain. There must be, here and there, a good many technical words and terms, used only locally or fallen into disuse, that it would be worth while to bring back into the language, and it would be an interesting and far from useless task if some competent person or association should undertake the compilation and publication not of another dictionary, but of a full and complete glossary of architectural terms. The American architectural vocabulary is, for lack of such an authority, very incomplete and weak, and is becoming weaker or at least more mixed every year, through the spreading use of French terms, introduced by those who have done all or most of their studying in Paris or from French books. A considerable list of French words which are driving out of use their English equivalents, just as "façade" has almost entirely displaced "front," will occur to every one. There is, perhaps, good reason for this: the French language is richer than the English in architectural terms and these also are more precise, many of them like *"rais de cœur,"* for instance, having no English equivalent. But there must be available a good many local American terms and still more English ones that we do not use that, if made accessible through a good glossary, would put a stay on the national habit of adopting foreign words and terms, so far as building matters are concerned.

FURTHER WORK OF M. CHARLES PLUMET.

WE have already seen in a previous article[1] the house which M. Charles Plumet built at the corner of the Ave. Bois de Boulogne and the Ave. Malakoff, Paris, a sumptuous house, full of variety and interest, the work of an artist imbued with the beauties of Gothic work, yet of strong enough personality not to permit of his being classed as a copyist even by the most casual observer. Mention was made in this previous article of other works of M. Plumet's, and of some of these other works I now wish to speak.

APARTMENT-HOUSE NEAR THE PLACE MALESHERBES, PARIS.

NO. 50 AVENUE VICTOR HUGO, PARIS.

INTERIOR VIEWS: HOUSE OF M. PLUMET, ARCHITECT, 49 AVENUE VICTOR HUGO, PARIS.

The apartment-house near the Place Malesherbes, just off of the Rue Legendre, was one of these. All in stone, except certain parts of the upper two stories, which are of brick, with its segmental-headed windows, its consoles, its segmental arches and its Gothic mouldings and details, it has a character quite its own, unique among its neighbors. It is undeniably stiff in many of its features, and lacks suppleness and flow. Many of the details are crude and amateurish. Yet it unmistakably has that charm which so many buildings lack, it being an honest attempt to express ideas strongly felt.

Let us pass over an interval of about eight years until M. Plumet had another problem almost identical in character, except that in the latter case the lot was larger and there was a little more money to spend. This second apartment-house is situated at No. 50 Avenue Victor Hugo. It has been built about two years,

[1] "American Architect" for March 2, 1907.

several years subsequent to the house on the Ave. Bois de Boulogne. In general, it preserves the same motives that were used in the former house. It is rather in the handling of them that we see the fruit of the experience and study of the intervening years. The façade is built throughout of a very light buff, almost white, limestone relieved only by the drab white mullions and the gray green balcony rails. The proportions are good, as is also the general mass, arranged to give good light to the rooms. The columns of the fourth story are well proportioned to the work they have to do. The supporting brackets, especially at the corners, are ingenious and happy in the manner in which they carry the pressure back into the walls. The balcony rails are quite free and most graceful in their lines. The motives in which they are worked out are adaptations of the eye in the peacock's tail. Throughout the façade we feel a much greater suppleness, and much less monotony. At the same time, the façade is much simpler than its prototype. It is much less encumbered with useless details, but yet it is not dry. The whole has considerable strength, yet it cannot be said it lacks refinement. There is another façade of M. Plumet's, facing on the tracks of the Belt Line that encircles Paris just within the walls, that has an especial interest due to the restrictions under which it was built. It is on the east side of the tracks, a little south of the Avenue Bois de Boulogne. Certain regulations forbade the use of projections from the wall surface. Its site dictated that it should be of brick rather than of stone, except in the lower two stories, which are of the very cheap and easily worked "*meulière.*" The window-heads are of brick arches, the corner blocks, lintels, and string courses being of limestone. The window guard-rails are of wrought-iron, except those in the windows at either side of the center. These latter are of stone. The lintels of a few of the largest openings are of steel I-beams, exposed and painted a gray-green, like the guard-rails.

HOUSE OF M. PLUMET, ARCHITECT, 49 AVENUE VICTOR HUGO, PARIS.

The windows are placed frankly where needed and of the relative size needed, which with the quite varied sky-line and with the play of color in the brick and stone leaves the façade, despite its lack of projections, anything but cold and monotonous. The proportions in general are good, which, with the care spent on many little details, such as the mullioning of the windows, the placing of bands and spots of different texture and color, and the varying of the window-heads, both as to form and as to height, give this façade an interest quite above the ordinary under such conditions.

Another treatment in brick we may see in the side elevation of an apartment-house facing on Avenue Victor Hugo, number 49. This is of yellow brick with wide mortar-joints. The base and the trimmings are of limestone. This base runs up into the third floor at one point so as to include the consoles for the projecting bay. The balconies are light and full of snap, swelling into varied shapes to give play to the whole. The openings are most frank, being exactly suited to the demands of the rooms into which they open. The general effect is most attractive, having a peculiar homelike quality that bespeaks pleasant interiors —a quality so lacking in most French apartment-houses.

It is of one of these interiors that I show a photograph. It is the large room on the ground floor, the one with the heavily grilled windows, used as the living room of M. Plumet's apartment, nearly all the others rooms on two floors opening out of it. The floor and most of the wood finish are of quartered oak, unstained. The mantel, which is most charming in its proportions and in its delicately sculptured frieze, is of a light buff gray brick. The andirons are of wrought-iron. Two beautifully carved columns of a fine grade of limestone uphold the wooden balcony. The plastered walls are tinted a buff, slightly lemon-yellow in tone, with a stenciled border decoration of grape and horse-chestnut motives in light yellows, reds and greens. The ceiling beams are painted to match the plaster with a stencil decoration similar to the wall border. The brass chandeliers are original, yet most reasonable in design. In fact all the furnishings are characterized by a simplicity and good taste that not only makes each article an object of interest in itself, but a happy component of an harmonious whole. As we look over this work of M. Plumet's we will find that it does or does not appeal to us; that is a matter of taste. It does have an interest for us, however, as the work of a man who realized that the accepted forms did not fully answer our present needs, and realizing it turned to the one really indigenous French style, the Gothic, for his inspiration, modeling it, transforming it, and infusing it with his personality to the end of creating a new style quite his own. This is what he has done for us.

G. B. FORD.

APARTMENT-HOUSE NEAR THE AVENUE BOIS DE BOULOGNE, PARIS.

FATIGUE IN METALS.

THE fact that stresses much less than the normal breaking stress will suffice to fracture a metal bar if applied sufficiently often was first discovered by Wohler, a German physicist, about fifty years ago. Naturally the subject is one of great importance to engineers and all users of machinery, and a good deal of experimenting has been carried out with a view to determining the precise nature of the changes which occur in metals when the stresses fluctuate periodically. In this article we are, however, more concerned with the engineering than with the physical aspects of the subject. Wohler himself carried out a classical series of experiments which were afterwards confirmed by Bauschinger and others. In recent years a good deal more work has been done in this direction, and several new facts have been brought to light, although there is still much uncertainty about the matter.

The results of the earlier experiments seemed to show that any stress greater than about half the normal breaking stress—the exact ratio depends upon the material and the nature of the stresses—would suffice to fracture the specimen if applied and removed sufficiently often, and that below this stress the material would withstand an indefinite number of applications of stress. A consideration of Wohler's results shows, however, that this limiting stress is not a constant for any given material, but is dependent upon the range of fluctuation and the mean value of the stresses. Thus the number of repetitions of stress required to produce fracture is much less with a fluctuation of, say, twenty tons per square inch about a mean stress of fifteen tons than with the same fluctuation about a mean stress of, say five tons per square inch. The point is of considerable importance, as it is frequently stated that the safe range of fluctuation is some fixed amount for a given material. This view is quite erroneous, and is largely due to the fact that when the fluctuation is between narrow limits of tension and compression the influence of the mean stress, which is low in any case, is small. When, however, as is often the case in practical engineering, the mean stress is itself considerable, the strength of the material to resist these repetitions of stress is largely dependent upon the value of the mean stress.

Another point of considerable importance brought out by Wohler's experiments is that an alternating stress fluctuating between, say, fifteen tons per square inch in tension and fifteen tons in compression, is much more dangerous than a fluctuation between zero and fifteen tons in either tension or compression, not both. It is for this reasan that engineers usually allow a higher factor-of-safety with alternating stresses than with those of which the direction is constant. Mill shafting is subject to alternating bending stresses, due to the belts and pulleys, whereas an engine crank shaft, with the flywheel carried by its own bearings at the end of the shaft, is subject to stresses which do not vary much in direction. It is interesting, therefore, to note that years of experience have led to the adoption of higher stresses for the engine shaft than for the mill shafting. Experiments by Professor Osborne Reynolds and Mr. Smith showed what had not been previously suspected—that the rapidity of application of the stresses greatly influences the results.

For any given stress the number of repetitions required to break the material increases with increasing rapidity as the rate of application of the stress is decreased, so that while 500,000 reversals may be required to produce fracture at 1,500 applications per minute, 50,000 may be sufficient at 2,500 per minute. Most of Wohler's experiments were carried out at about sixty applications of stress per minute; those of Reynolds and Smith varied between 1,500 and 2,500, while those recently carried out by Stanton and Bairstow at the National Physical Laboratory had a frequency of 800 per minute. Unfortunately the results of these different observers do not fall into line very well on this question of speed, and doubt has been expressed as to the truthworthiness of the high-speed results on this point. Their accuracy, so far as it concerns the general nature of the influence of the high speeds, seems, however, to be unimpeachable, and in these days of steam turbines, high-speed electric driving, and increasing speeds generally the point is one requiring consideration in engineering designs.

Another important point which experiments have brought out is the very great weakening effect of sudden changes of cross-section in the specimen. Taking the strength (as measured by the limiting range of alternating stress which would just not break the specimen, however often the stress might be applied) of specimens with no sudden changes of cross-section as one hundred per cent., the strength of specimens having screw threads or almost square shoulders cut on them is, according to the experiments of Stanton and Bairstow, about fifty-five per cent., and when the specimen has a perfectly square shoulder the strength is reduced to twenty-five per cent. The exact strength ratios will probably depend upon the precise proportions of the specimen, but the results given will serve to show that square corners and sharp-bottomed grooves should never be employed if they can possibly be avoided.

As to the nature of the internal changes produced in metals by repetitions of stress, we are still somewhat in the dark, although the beautiful experiments of Ewing and Humphrey have thrown much light on the behavior of mild steel and wrought iron under the influence of alternating bending stresses such as are met with in mill shafting. They showed that the crystalline grains of which the metal is composed slip slightly along approximately plane surfaces within the grains, just as two slates might slide on each other. As the number of alternations of stress rises the number of these slipping surfaces is increased, and they gradually develop into cracks. Now a crack in a stressed bar of metal sets up very high local stresses at the bottom of the crack, and consequently the cracks tend to grow, until finally the specimen breaks. Screw threads and sharp corners act in a similar manner to a crack, but in a less intense degree. Whether the phenomena attending the fracture of bars in which the stress fluctuates, but does not reverse, are the same as those discovered by Ewing and Humphrey has not been ascertained, and the results of past experiments make it dangerous to prophesy. There is still much research work waiting to be done in connection with the fatigue of metals, especially as to the effects of annealing or tempering at various stages in the applications of stress.—*Manchester Guardian.*

UNDERWRITING AND OTHER TERMS[1]—II.

"High-test Sprinkler Heads."—See "hard sprinkler heads."

"Hog-chain Beam."—A beam having one or more struts or straining posts beneath, under which a tie-chain or tie-rod passes to prevent the beam from hogging or bending.

"Hollow Finished."—A ceiling, partition or wall sheathed, plastered or otherwise finished in such a way as to leave an enclosed or hollow space.

"Hooded."—Provided with a sort of canopy shield, generally of metal; may have a flue at the apex to carry off smoke, heat or gases.

I.

"Isolated."—Separated from other buildings or risks, and therefore presumed to be unexposed; detached a considerable distance.

J.

"Jack-shafting."—Intermediate shafting for driving counter-shafting, which in turn drives machinery directly.

"Jamb."—In a window or door frame, a vertical side member serving to support the head.

L.

"Lagged."—Covered or jacketed to prevent the loss, escape or waste of heat; as a boiler breeching is lagged with asbestos, cement or mineral wool, etc.

"Ledge."—The narrow shelf formed where a wall increases in thickness.

"Light-court."—

(a)—A space within a building open at the top to admit light and enclosed by walls which usually contain windows.

(b)—The enclosure formed by erecting buildings about an open space.

"Light-shaft."—An enclosed space, smaller than a light-court, through the floor or floors of a building, usually under a skylight. The enclosure may consist wholly or in part of glass, for the purpose of lighting the interior. See "light-court."

"Light-well."—An unenclosed opening through the floor or floors of a building, usually under a skylight, for the purpose of lighting the interior.

"Louvred."—Ventilated on one or more sides by an arrangement of slats arranged one above another and slanting downward and outward.

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[1]Report of the Committee on Uniform Requirements, submitted at the annual convention of the National Fire Protection Association, and here continued from page 242, No. 1643.

M.

"Magnetic Separator."—A magnetic device placed in the chutes or feed-spouts of grinding mills, as malt mills, for the purpose of arresting iron or steel particles which, if allowed to pass to the rapidly moving metal parts of the mill, might strike a spark, causing a dust-explosion.

"Marine-leg."—A movable elevator leg so arranged that its boot can dip into a ship's hold; generally built at the side or end of a grain elevator, but sometimes in a detached tower.

"Meeting-rail."—The combination of the bottom rail of the upper sash and the upper rail of the lower sash of a double-hung window.

"Mullion."—A vertical structural member of a window frame, serving to separate and support adjoining sashes.

"Muntin."—In window sash, a vertical or horizontal strip separating panels or panes of glass in doors or windows.

O.

"Open-finished."—Referring to wooden ceilings and floors and inner surface of frame walls, without concealed spaces; not finished at all, or so finished that the studding or joists are exposed.

P.

"Plain-finished."—Referring to inner surface of incombustible walls and to ceilings of incombustible material, left without finish or plastered directly without furring; having no concealed spaces.

"Pompier Ladder."—A scaling-ladder having a center pole with step-rungs projecting on either side and a large hook at the upper end to catch over window-sills, parapets, etc.

"Protection."—

(a)—Private—

1st. Precautionary methods or devices intended to prevent fire or to notify of unsafe conditions, as personal patrolling of premises by assured watch service, automatic journal alarm, low-water alarms on boilers, etc.

2d. Signaling systems intended to give quick notification of fire, as automatic or manual fire-alarms, sprinkler-valve alarm, etc.

3d. Signaling systems intended to give notification when protective apparatus is disarranged, as sprinkler supervision.

4th. Fire fighting and extinguishing devices of whatever nature under the control of the assured.

(b)—Public—

All devices and apparatus not under the direct control of the assured intended to transmit fire signals or aid in the extinguishing of fires, as fire-alarm telegraph, city water works, fire-departments, fire-patrols, etc.

(c)—As applied to structural members in building construction, fireproofing.

(d)—As applied to combustible material exposed by heat devices, etc.; fireproofing, clearance or fire-extinguishing devices.

(e)—Referring to exterior or interior openings in walls; fire shutters, wired-glass windows, water-curtains, etc., or fire-doors.

"Pulley-style."—That part of a box-frame which is next the sash and contains the pulley.

R.

"Rheostat."—An electric device for regulating the amount of resistance in a circuit.

"Risk."—Properly speaking, property covered by a contract of insurance or policy. Sometimes used in inspection reports to designate the property covered by the report and which may or may not be insured—as good risk, poor risk, etc.

"Roof."—

(a)—"French." A form of roof with almost vertical sides, sometimes concave or even convex, and the top usually flat or sloping toward the rear; the sides are commonly pierced with dormer or other windows (*"Century"*). The term is also applied to roofs of buildings which may have such roof construction only in front and (or) at one or both sides. It derives its name from its fancied resemblance to the French mansard roof, which see.

(b)—"Hip." One which rises by equally inclined planes from all four sides of a building.

(c)—"M-roof." A double roof shaped like an "M" and consisting of two peaked roofs placed side by side.

(d)—"Mansard." A form of curb-roof, the lower slope of which approaches the vertical while the upper slope is variable, but much more nearly flat than in the typical curb-roof; the lower section of roof is pierced with windows (*"Century"*). The term is also applied to roofs of buildings which may have such roof construction only in front or (and) at one or both sides. See French roof.

(e)—"Pitched." One with inclined planes meeting in a ridge; a peaked roof.

(f)—"Saw-tooth." Consisting of two or more regularly occurring slanting roofs, the planes of which are parallel, with glazed sash in the vertical space between the top of each plane and the bottom of the next; a cross section of the roof resembles saw teeth, giving rise to the name.

"Roof-laths."—The narrow strips across rafters to which slates or shingles are nailed, sometimes called *"spaced sheathing."*

"Rosette."—A circular ceiling fixture, usually of porcelain, from which drop-cords for incandescent lamps or other electrical devices are suspended.

"Rotary Converter."—An electrical rotor machine designed to convert alternating current into direct current.

S.

"Sash."—In a window, the framework for holding the glass; it consists of sash bars fixed at the ends into two horizontal rails and two vertical stiles. The sash is hung in a window frame. When it slides vertically it is counterbalanced by sash-weights, connected by sash-cords to the sash and weights.

"Scupper."—An outlet provided for the escape of water from a floor; generally required in sprinkled buildings.

"Setting."—The enclosing walls of any heat device; as boiler setting.

"Short-circuit."—A contact between electrical conductors of different potential, without the intervention of resistance, so that for an instant a theoretically unlimited current flows through the conductors and the contact.

"Shotgun-feed."—The long steam cylinder in which works the piston and rod operating a saw carriage.

"Siamese."—To connect two or more hose leads in such a way as to supply a larger lead or main or play-pipe.

"Skewback."—The inclined surface from which an arch springs.

"Skylight."—

(a)—A glazed opening in a roof to admit light.

(b)—"Lantern." A roof structure with apertures to admit light.

(c)—"Monitor." A skylight set on vertical frames, with windows in the sides and ends of same.

(d)—"Texas." See "monitor."

"Spaced."—Separated at approximately regular distances; as sprinkler heads, sprinkler pipes, floor planks not laid tight or close together, joists, roof-laths, etc.

"Spline."—In carpentry, a rectangular piece of wood used to secure a joint by fitting into two grooves opposite each other.

"Sprinkler."—To equip with automatic sprinklers.

"Sprinklered."—Equipped with automatic sprinklers.

"Sphincter Hose."—Hose that is wound with wire to prevent wear and tear as well as to strengthen it. Generally rubber hose, such as is used in boiler cleaning.

"Squeegee."—An implement shaped like a wide hoe with a rubber strip at the edge of the blade; used by firemen to push water out of the rooms and off floors in cleaning up after a fire.

"Staggered Space."—An arrangements of objects in such manner that the individuals in one row are opposite the space between the individuals of the row on either side. Sprinkler heads are often so arranged.

"Stairs."—A flight or series of steps.

(a)—"Continuous." One in which the successive flights are in the same general line, with only a landing at each floor to break the continuity.

(b)—"Flight-above-flight." One in which the successive flights are over each other and run in the same direction.

(c)—"Helical." Winding; commonly called spiral.

"Starting-box."—A rheostat used for starting and controlling direct-current electric motors.

"Steam-nigger."—A device consisting of steam cylinders, levers and hooks or lugs to manipulate logs at a saw-carriage.

"*Stile.*"—In a window sash, the vertical side members to which the horizontal sash bars and rails are attached.

"*Strut-board.*"—The piece of board under the pulley in an elevator head which connects the legs and serves to finish the enclosure at this point.

"*Switchboard.*"—A board, rack or table carrying the various make-and-break devices, indicating instruments and other controlling apparatus of an electric power generating or distributing system.

T.

"*Texas.*"—A roof-house containing one or more stories.

"*Thimble.*"—A short, cylindrical sleeve or bushing, frequently double, about a pipe where it passes through a wall, roof, partition or floor, etc., for the purpose of protecting inflammable material.

"*Tie.*"—
(a)—A timber, rod, chain, etc., binding together two bodies which have a tendency to separate or diverge from each other; opposed to a strut.
(b)—Any member in framing that is in tension. In a roof truss the lower horizontal member is called the *tie-beam* if of wood, and the *tie-rod* if of iron.

"*Tile.*"—
(a)—"Dense." Building tile of little porosity, or dense and hard; opposed to porous tile.
(b)—"Porous." Building tile which is porous or cellular; made by incorporating sawdust with the clay in working the latter, the sawdust burning out when the tile is fired in the kilns.

"*Tongue.*"—A ridge worked on the edge of a board to fit into a corresponding groove in the next board. The joint is called tongue-and-groove. See "spline."

"*Top Rail.*"—The upper rail of a door or sash.

"*Transformer.*"—A device acting by induction to lower or raise the voltage of an electric circuit; termed step-up or step-down, according as it raises or lowers the voltage.

"*Transom-bar.*"—
(a)—The horizontal member in a door or window frame which separates the movable parts below the transom from the part or stationary sash above the transom.
(b)—In the absence of the above described bar, usually the bottom rail of the upper sash is made to fit tightly against or into grooves in the upper rail of the lower door or sash, or vice versa, in which case the two rails so united are known as a transom-bar.

U.

"*Unbroken Area.*"—An area which is in no way subdivided by walls or partitions.

V.

"*Valve.*"—
(a)—"Air." See "dry-pipe valve."
(b)—"Ball-check." A check valve in which the closing device is a solid sphere, usually metallic, unattached, but retained within a chamber in such a way that the flow of fluid carries the ball to a ground seat, interrupting the flow.
(c)—"Dry-pipe." In a dry-pipe sprinkler system the automatic valve, which is held closed against the water supply by air pressure in the system.
(d)—"Flap-check." Also known as clack-check and disc-check. See "swing check."
(e)—"Foot." A gravity flap in the lower end of a pipe to prevent the escape backward of liquid or steam once passed up through it.
(f)—"Gate." A valve with a sliding gate.
(g)—"Pop." One which opens automatically at a predetermined pressure, above which it might not be considered safe for the pressure to rise. A form of safety-valve.
(h)—"Swing-check." A check valve with hinged disc, in distinction to ball checks and other types of check valves. Used in pipe lines to permit flow in one direction and automatically prevent reversal of flow.

"*Ventilating-Shaft.*"—Similar to air-shaft as to construction, but used to remove impure air, gases, etc.

W.

"*Wall.*"—
(a)—"Brick-nogged." A frame wall in which the space between the studding is filled with brick.
(b)—"Brick-veneered." A frame wall in which a layer of brick instead of clapboards is laid outside the sheathing.
(c)—"Divison." A wall which divides a building or room into sections; an interior wall which may have no openings, or protected or unprotected openings; when extending above combustible roofs without openings or with properly protected openings it is called a fire-wall, which see.
(d)—"Fire." A substantial wall of incombustible material, such as brick, concrete, stone or solid tile, extending above combustible roof and having openings (if any) protected by fire doors (usually on both sides of opening); always a division wall; when dividing frame sections it is often required that it must extend several feet beyond the exterior walls of same, or have wings replacing the frame walls for some distance to prevent lap of flames.

"*Window.*"—
(a)—"Box-frame." A hollow window frame, such as is used where the sash is hung with cords and weights.
(b)—"Casement." A window in which the sashes are hung on hinges at the sides.
(c)—"Crapaudine" (krap-a-din). In architecture, turning on pivots at the top and bottom; said of doors and windows. Regular dictionary term, but not in common use.
(d)—"Double-hung." A window in which both the upper and lower sashes are hung with cords and weights.
(e)—"Double-pivoted." One in which both sashes are pivoted horizontally.
(f)—"French casement." A sash or pair of sashes hung like a door, so as to answer the purpose of both door and window.
(g)—"Single-hung." A box-frame window in which one sash is stationary or fixed and the other arranged to slide.

"*Well-hole.*"—An unenclosed opening in a floor, or a series of unenclosed openings, one above another, in the floors or stairs of a building.

"*Wired Glass.*"—A solid plate of rolled glass having wire netting embedded in its centre during the process of manufacture. When properly made the two materials become as one, combining the strength of the wire netting and the glass plate, the latter being homogeneous and solid and the former so thoroughly covered as to obviate the possibility of rust or corrosion. Applicable when properly framed as a protection to exterior openings against moderate exposures, and for skylights, etc. See National Board rules for proper construction and installation of wired-glass windows.

"*Working Gallery.*"—A gallery in the wing of a theater upon which the men stand who manipulate the various ropes for raising and lowering scenery. There are usually two or more of these galleries, one above the other, in each wing.

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DETAIL OF THE KATHERINENKIRCHE, BRANDENBURG-ON-THE-HAVEL, PRUSSIA.

This plate is copied from *Blätter für Architektur.*

NOTES AND CLIPPINGS

BRIDGEWATER HOUSE, LONDON.—Bridgewater House, the London home of Lord Ellesmere, is not, as many people seem to think, an ancient mansion, but was built some eighty years ago for the first Lord Ellesmere of the present creation, from the designs of Sir Charles Barry, the architect of the Houses of Parliament, on the site of Berkshire House, where, according to Pepys's Diary, Lord Clarendon, Chancellor of King Charles II, made his home. It is one of the grandest residences, or rather palaces, of the British metropolis, looking out onto Green Park, from which it is merely separated by a large lawn. Its feature is a great hall, which extends the full length of the building, and goes right up to the dome-shaped roof, with side galleries, out of which all the rooms open. Pillars run up to the summit, and at the side are arches, the decorations of which consist of the armorial bearings of the Egertons; while the staircase has panels of marble below, and of blue and gold above. The picture-gallery contains the most famous private collection of paintings in London, its treasures accumulated by the last Duke of Bridgewater comprising Titian's renowned "Three Ages of Man," four Raphaels, fifteen Tenniers, Vandyke's only attempt to paint the Virgin and Child, besides numerous other old masters and modern paintings. Indeed, Bridgewater House is what the poet Swinburne justly proclaims "a palace of paintings."—*Marquise de Fontenoy, in N. Y. Tribune.*

A CONCRETE LIGHTHOUSE.—By the use of concrete a tall lighthouse was constructed in a short period of time at the Point de la Coubre, at the mouth of the Gironde River, in France. The building is 225 feet high and about 35 feet in diameter at the base. It was finished in nine months after the beginning of the work, and cost $90,000. The haste was due to the fact that the sea threatened to wash away the old structure.—*Exchange.*

PALACE OF NESTOR FOUND.—During excavations near Pylos, conducted by the German Institute of Athens, a vaulted edifice containing many gold ornaments and other valuables was discovered this month. Experts believe the building to have been the palace of the Homeric king, Nestor.

THE SERIOUS CONDITION OF WINCHESTER CATHEDRAL.—It would seem that the more the condition of the Winchester Cathedral fabric is investigated the more serious are the evidences of decay. Alarming cracks and fissures have been found in the walls of the south transept. It was only a short time ago that similar trouble was found to exist in the north transept, and this has had to be shored up. The south transept doubtless will have to be strutted also, as it is about four feet out of plumb. The vaulting of the south aisle of the presbytery is now being removed, it having been found to be so badly crushed and strained as to necessitate this. The diver is working under the Lady Chapel at the eastern end. Shoring is being erected to support the three buttresses of Bishop Fox's aisle on the south side, and it has been discovered that the flying arches at the back of the buttresses are in a very dangerous condition. Excavations are being made to the foundations in readiness for underpinning operations to be carried out here. The large cracks in the north transept have been strengthened, and scaffolding is being erected to deal with the remaining cracks. The work on the west front is proceeding apace, the whole of the north spire having been strengthened and bonded, and the little pinnacles placed in position. The condition of the tower is under investigation. Two years ago, when the alarming condition of Winchester Cathedral was made public, it was suggested that £100,000 could be spent upon the buildings, and that that was the sum which would be required to make it thoroughly stable. Detailed examination of the fabric has now proved that its condition is far worse than was ever dreamed of, and the more it is pulled about the greater is the extent of decay revealed. The appeal for funds, which began at a modest £12,000, quickly increased to £30,000, and further revelations made it evident that at least £50,000 was required. Now a further special appeal for the preservation of the north and south transepts is to be made, and it looks as if the suggestion that £100,000 would be wanted was not so far over the mark. At present about £25,000 has been obtained, and for some time now the fund has been almost at a standstill. The Winchester pageant next year will no doubt do a great deal for the fund, but it cannot be expected to yield all that is required.—*The Builders' Journal.*

ANOTHER FIND IN ROME.—The continued excavations on the Palatine Hill have resulted in the discovery of what are believed to be the original decorations of a temple of Asia Minor dating back to the sixth century B. C. They were found in the most ancient of the Palatine temples, that of Victory, made famous by the worship of Cybele, known in Greek mythology as the "Great Mother of the Gods." The decorations, according to the legend, fell from Heaven to Pessinus, the ancient city in Asia Minor, noted for the worship of Cybele, whence they were removed to Rome in 204 B. C.—*Exchange.*

BUENOS AYRES.—Though founded centuries ago, the modern Buenos Ayres is younger than Chicago. It is the boom town of the southern continent, quite as emphatically as the metropolis on Lake Michigan stands for the record growth of a North American city. One expects much before he reaches Buenos Ayres, for he has read of its marvels, and travelers' twice-told tales have prepared him for a great, prosperous, busy city. But when he gets there, he is inclined to exclaim with the Queen of Sheba, "the half had not been told." Yet, very largely, this modern Buenos Ayres has been built up within the last fifteen years. Ten years ago horse-cars plodded through the streets and the drivers blew their cow horns at every cross street to warn passers by that they were coming. Now swift electric-cars clang their bells as they go rushing through the narrow streets at a rate which one would think would make them twice as fatal as the Juggernauts of Serampore. Fifteen years ago most of the streets were paved with cobble-stones, and horribly paved at that. Now all the principal streets are paved with asphalt and the automobiles and rubber-tired carriages, drawn by splendid horses, roll as smoothly over them as over the boulevards of Paris. Huge buildings are going up everywhere, great business blocks of six or eight stories and covering an immense ground space (for skyscrapers are not yet allowed). It is said that 30,000 houses will be built this year, yet it is almost impossible to secure a house, and then only at a tremendous rental. Beauty has not been ignored in the architecture of the city, though it must be confessed that the old Spanish style which still prevails, of a low building of one or two stories, built around an inner courtyard, or patio, does not lend itself to imposing structures, however pleasant the interior of the house, with its flower-decked patio, may be. In many cases, however, in the leading streets, the architects have broken away from the old traditions, and most of the modern buildings would do credit to any city in the world. The Plaza de Mayo, for instance, it would be hard to match for the beauty of its surrounding buildings in any city of the North American continent, and the avenue of the same name, which leads out of it, is finer than the famous Unter den Linden of Berlin.—*Francis E. Clark, in Boston Transcript.*

THE VALUE TO COMMERCE OF THE PANAMA CANAL.—When we examine the principal sea routes and measure their distances, it will be seen that the Panama Canal occupies an unfortunate position as regards its prospects of securing a share of the seaborne commerce of the world. Plymouth is one of the most westerly of the great ports of Europe and Yokohama one of the most easterly of those of Asia. It will doubtless be a surprise to many that these two ports, at the extreme ends, are 1,725 miles nearer to each other by the circuitous route of the Suez Canal than by the almost direct route via the Panama Canal. Even Sydney in Australia is nearer by the Suez Canal by 1,200 miles, and New York itself is only equidistant by either route. It is only to Wellington in New Zealand that Panama gives a shorter route by 1,000 miles from Plymouth. Even this small point in its favor is reduced to 636 miles by the Cape Horn route. In a voyage of 11,000 miles an extra 600 miles in an open sea may be preferred to the trouble and expense of being locked through a canal. The fact is, the Suez Canal is situated at the heart of three continents and is of world-wide importance, while the Panama Canal can only hope to serve local interests.—*E. A. S., in Indian Engineering.*

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SOCIETIES, PERSONAL MENTION, ETC.

THE account against the all-pervading automobile daily grows larger, and it is a complete proof that the majority of Americans are law-abiding citizens, that they do not resort to Lynch law against the many lawless users of a useful vehicle. With the ordinary run of "street accidents" we have no concern; but the spectacular burning of garages in New York, Boston and elsewhere has proved how unjustly the interests of real-estate owners are jeopardized by reckless users of gasoline. To overcome these dangers the National Fire Protection Association has formulated the useful rules that may be found in another column of this issue.

THERE seems to be a growing likelihood that during one of the next sessions of Congress, the long session probably, Senator Newlands, of Nevada, may introduce a bill to establish a Department of Fine Arts, one moreover presided over by a Cabinet officer. The present movement takes its rise in New York, where the Fine Arts Federation, the New York Chapter, A. I. A., and the Society of Beaux-Arts Architects have been considering the matter and have appointed a committee, consisting of Messrs. S. B. P. Trowbridge, C. F. McKim, D. H. Burnham and W. A. Boring, to formulate a scheme and prepare the needed bill, a leading item in which is an appropriation for five million dollars to enable the erection at Washington of a National Gallery of Art. The proposition is an important and many-sided one, and we trust that it may have thorough discussion before anything like concrete action is undertaken. As we have often urged the need of a national gallery at Washington, that part of the programme has our approval, but, when we come to the value and need of a Department of Fine Arts, we confess to having very grave misgivings, and we will say frankly that there seems no good reason why the President's official family should be cumbered with the presence of a Secretary of the Fine Arts any more than by a Secretary of Millinery. Official art and still more officialism in art are things to be dreaded rather than sought and encouraged.

BUT the thing of most importance, the thing to be kept ever in mind, is to remember how grave are the dangers that inhere in our political system, with its shift and change, and the constant tendency of the right men to withdraw from contact with public affairs because of the ever-pressing advances of the wrong men, the placemen, the professional politicians. One could hardly conceive a greater misfortune for American civilization than to have the institutions of higher education—Harvard, Yale, Columbia, etc.—made subject to a control lodged in the hands of such officials as may at any moment come into power in this democratic country. And yet art should be more untrammelled than the sciences, freer even than poetry. How far it would be possible to foresee and provide against the evils we perceive, it is impossible to decide. To found our new system, with its rules and limitations, on the systems that have worked with some success, but a very limited success, in Europe, would be dangerous, for the reason that our civilization, our life, and above all the material in our public servants, are so wholly different from anything common to the life of the older countries. We are rather inclined to feel

that more of real effective good could be accomplished by taking up the idea of an unpaid commission, like the Consultative Board of Architects President Roosevelt sought to have officially recognized, than by establishing a fully manned Department whose officials, being in office and drawing pay, would feel constantly impelled to "do things," whether needful or not.

THE competition for the International Bureau of American Republics building which was decided a fortnight ago in favor of the design presented by Messrs. Albert Kelsey and Paul P. Cret, associated architects, of Philadelphia, in certain ways compels comparison with the competition for the Peace Palace at The Hague, partly because the purposes of the two buildings are very similar and partly because Mr. Carnegie's seemingly endless means, which provide absolutely for the latter building, furnish the major part of the cost of the former. In both cases the number of competitors was unusually large, in both cases the competition was of the "mixed" variety, and in both cases the jury of award was composed of men of known reputation and accepted standing. Both competitions are rather notable for the celerity with which the decision was reached and the award announced; it is to be noted, however, that although the number of designs in the American competition exceed, by a couple of dozen, those submitted in the Dutch affair, the jury required less time in reaching the end of its labors. This does not imply that these jurors slighted their task, but was due probably to the fact that they were younger men. It is further certain that Messrs. McKim, Hornbostel and Lord, who were selected as the jury by the letter-ballot of the competitors, were personally thoroughly well known to one another, and so could properly value one another's opinions and understand what respect to accord them. There were none of the bothersome considerations of international courtesy to subconsciously affect the judgment, and no one had to feel that perhaps, after all, the Austrian, the Frenchman, or the German really knew more about architecture than the others, and so could claim paramount consideration for his opinions.

BUT the really significant fact in both affairs is that in neither case was the design of any of the specially invited, and paid, competitors placed. This outcome does not mean that the designs submitted by the invited architects were not worthy of their authors' reputations, but it does prove that, in the case of a public building, there is too good a chance of procuring from an unknown and unsuspected source a better solution than can with certainty be furnished by any known man for public authorities to feel that they have a right to neglect the chances afforded by the open-competition method. On the other hand, it does not do for those who favor open competitions to argue that the promoters of these two affairs wasted the money paid to the specially invited competitors. The operation they entered on in paying these special fees was nothing more nor less than a justifiable, prudent and not too expensive underwriting. They assured to themselves in this way a good success, while not closing their eyes to the chance that the open element of the programme might bring them a better.

NOR does it do for those who condemn open competitions as inexcusable and vicious to argue in support of their views that in this competition, with its one hundred and fifty competitors, there was an enormous waste. The chances are that there was really very little waste, either actual or constructive. The probability that anyone entered the competition with so strong a belief in the certainty of success as to induce him to expend more in time and money than was commercially justifiable is fairly remote. Where this belief was absent, it is fair to assume that the inducing cause that influenced the competitors, in the main young and unknown men, was largely and essentially a desire for self-improvement, an availing of an opportunity of measuring their actual capacities by the standard furnished in the design accepted by the jury. They were, in a manner, merely indulging in "practice spins," and there can be no real and fruitless waste in such efforts, even though their cost in money and time expended can be made to aggregate an impressively large sum. As properly might be charged to waste the time and effort a man spends of a morning in swinging the Indian clubs, so that he may keep in decent physical condition. Except the born marksman, no one can become a sharpshooter, unless he spend much time and money at the rifle-range.

THE plight of the specially-invited competitors whose skill and fidelity underwrite the success of mixed competitions is not, however, so agreeable to contemplate, when, time after time, not one of their efforts is placed by the jury. To be defeated by one's acknowledged peers, while disagreeable, of course, contains no sting poisonous to one's self-esteem, but it surely is disconcerting to find that the ever-teeming ranks of the young and unknown are so heedless of the respect and self-effacement that should be manifested in the presence of established reputations. It is understandable, then, why specially-invited architects hesitate to take part in mixed affairs unless the honorarium assured them is really substantial, for, aside from the net cost of their draughtsmen's time which they have to assume, something is due to them because of the unavoidable advertising of the fact that some, or all, of them are sure to be defeated contestants, and this exploitation of misfortune, which is commercially disadvantageous, is escaped by the uninvited and unpaid who take part in the contest. There is nothing in this that should fairly detract from the merits of the mixed-competition method; but a real hardship is involved, and promoters should be made to see that because of it there is good reason for their adjusting the honoraria for the invited competitors on a really liberal scale.

ABOUT the same time, the mayors of New York and Baltimore seem to have found it desirable to follow the example set by Boston several years ago, and have taken steps to procure for themselves the aid and comfort that can be derived from a consulting-architect. In New

York the movement takes the form of the appointment of Mr. Walter Cook, A. N. A., at present the architect member of the Municipal Art Commission, at a salary, it is said, of five thousand dollars per year. If the latter fact be as reported, it would seem to imply the resignation of Mr. Cook from the Art Commission—a regrettable step—as the members of that body are expected to draw no salary from the city for their services, and as Mr. Cook must, as a salaried official, advise the Mayor on many matters that must come before the Art Commission, it would be easy to lay a colorable charge that the rule requiring unpaid service was being broken. In Baltimore, the Mayor adheres to the gratuitous-service idea and asks for the appointment, not of a single architect, but of an unpaid commission of architects, with whom he may consult and advise on architectural matters as they affect the city. As Boston, New York and Baltimore all have Municipal Art Commissions, the appointment of the new officials in the latter cases should result, as it has in the former, in matters being brought before the final authorities in their best and most simplified forms.

THE New York *Times* usesavery fit word in speaking of the recent strike of the drivers in the Sanitary Division of the Street-cleaning Department of that city, when it speaks of the demonstration as a "mutiny." We have ourselves, under somewhat similar circumstances, spoken of the striking of public servants as treason, and we still believe that this word better defines the act. In either case the central idea seems to be the same, and that is that the striking of the servants of the community is a condition of affairs that the community is wholly justified in putting an end to promptly and with the strong hand.

WE have before this pointed out how French architects have established their superiority over English and German architects as artists of sensibility and adaptability by the way in which, when called upon to build in any of the French colonies, they have frankly adopted the fashions of the country, so far as the elements of style and design go, while marshalling them into new forms of composition not familiar to the natives. This admirable trait is likely to be fostered and promoted by the recent action of the Governor-General of Algeria, who has established, in an old Moorish villa just outside of Algiers, a species of Villa Médicis, where those young artists who succeed in carrying off the prizes may for a term of years study at government expense the several expressions of Oriental art, just as at Rome for hundreds of years the remains of Classic and Renaissance art have been studied by generations of Prix de Rome men. In time, the Villa Abd-el-Tif may become as familiar a household word in the ateliers of the École des Beaux-Arts as the Villa Médicis has always been. The jury in whom is vested the appointment of the new *pensionnaires*, is presided over by M. Bénédite, curator of the Luxembourg Galleries. The new Algerian Academy opened in May with but two resident scholars, M. Paul Jouve, sculptor, and M. Léon Cauvy, painter; but we imagine that later an architectural student will be added to the small companionship, even if there be no representatives of the other arts that find housing in Rome.

IN examining the advance of real-estate values on Fifth Avenue, the New York *Herald* brings out some curious facts that go to show how valuable an item in one's heritage the "unearned increment" may be. Attention is called to three parcels of land that have been sold this year, viz., those at the corners of the Avenue and Thirty-sixth, Thirty-eighth, and Forty-second Streets, at $700,000, $1,825,000 and $800,000 respectively, and it is shown that between 1842 and 1845 these same parcels were sold for $500, $2,400 and $900. These figures are impressive enough, but not so impressive, we fancy, as would be found those which should, sixty years from now, declare the value of the unearned increment if the vendors of the three parcels should invest the proceeds in some of the deforested land of Michigan or Maine, replanting it in white pine and leaving their heirs to harvest the product.

THE disquieting news that the bubonic plague has appeared on the island of Trinidad in the Southern Carribean, while it causes anxiety lest the terrible devastation that has for years been going on in India may be repeated in this hemisphere, suggests to the speculative mind a pleasanter idea. It is now accepted as proved that rats and mice are potent distributors of this practically incurable disease that has existed in Eastern countries for centuries, and it is known that at times it raged in Egypt. It seems possible that the Egyptians in very early times, perhaps before the time of the shepherd kings, knew that the rat was an active disseminator of the disease, and undertook to check it, not by any system of inoculation of man or rodent, but by the active breeding of *felis domestica,* for the cat was domesticated first in Egypt, and, as is well known, was a sacred animal for centuries, under the protection of the cat-headed Goddesses Bast and Pakht, and is to this day a much venerated animal. It seems more likely that the cat should, out of real gratitude, be endowed with sacred attributes because of having conferred on the Egyptian race a signal benefit, such as would be the checking of the progress of the bubonic plague, than because it merely prevented the waste of the corn contained in the vast public granaries of the time.

SO many cities are just now undertaking a revision of their building ordinances that it would seem as if some real good might result, if the several committees charged with these revisions could hold a caucus and discuss the matter jointly. Independent revision is likely to result, in each case, in a mere patching of the existing ordinances, whereas, if all these committees could come together and discuss the matter, the result might be a general code, of satisfactory usefulness everywhere, upon which it would be easy to embroider the special conditions that the local peculiarities and conditions of each city made obligatory or desirable. In any event, we fancy that the admirable, though rather voluminous, building-law adopted two years ago by Cleveland, O., will to a considerable extent be taken as a model.

Motor Garages and Fire Protection

THE National Fire Protection Assocation of America has provided a series of rules in respect to the construction and equipment of motor garages which it would be well to study, having regard to the rapidly increasing hazard of motor-car storage in the metropolis and elsewhere..

The rules, which we publish below, are most comprehensive; indeed, they err perhaps a little in extreme detail, but seeing that they are to be applied by insurance companies, who have to bear the risk of all too frequent fires in buildings of this class, it is not to be wondered that attention has been paid even to trivialities:

DEFINITIONS.

Section 1.
A "garage" is—
(a) A building or that portion of a building in which vehicles equipped for using or carrying volatile inflammable liquid for fuel or power are kept, whether said vehicles are kept for use, for sale, for rental, for exhibition, or for demonstrating purposes, and—
(b) All that portion of a building that is on or below the floor or floors on which an automobile carrying a volatile inflammable liquid is kept, and is not separated therefrom by approved and unpierced fire-walls and floors.

Section 2.
A "volatile inflammable liquid" is any liquid that will emit an inflammable vapor at a temperature below 100 degrees Fahr. when tested in—
(a) The open air, or—
(b) The closed pyrometer of Giuseppe Tagliabue.
1. An "automobile" is any self-propelled vehicle.

THE BUILDING: ITS POSITION AND SIZE.

Section 3.
An automobile carrying a volatile inflammable liquid shall not be placed in a building—
1. If built of wood shall be not more than 15 feet high.
(a) Shall have a capacity for not more than four vehicles.
(b) Must be located at least 20 feet from any other building.
2. Must not be located in a building in which any part is occupied as a dwelling, a hospital, a theatre, a church, a school, or as a boarding, lodging or tenement house—the only exception to this provision is that a private garage may be located in a building occupied in part as a dwelling by the family of an owner, or lessee, or an employee;
(a) Where at any one time more than ten people congregate in a portion of the building that is outside of the garage and is not separated therefrom by unpierced approved fire-walls and floors;
(b) Where all sewer connections from wash-stands and sinks are not provided with an approved oil trap with a glass gauge pipe and a draw-off cock, in a readily accessible place and where not liable to injury.

FIRE-RESISTING CONSTRUCTION.

Section 4.
Must be of approved fireproof construction—
(a) If intended for storage of more than four vehicles;
(b) If built within 20 feet of any other building;
(c) If other portions of the building are to be used as a dwelling, a hospital, a theatre, a church, a school, a boarding, tenement or lodging house, a store or manufactory, where more than ten persons are employed, and in all such cases the floors, ceilings and walls must be unpierced, except that there may be windows fitted with approved metal frames and sash glazed with wired glass in walls opening on a street, public highway, or space separating it at least 5 feet from any other building.

STORAGE.

Section 5.
Closets for storing volatile inflammable liquid in safety-cans shall, where possible, be outside the main building, and shall—
1. Not be larger than required for the purpose;
2. Be lined inside and covered outside with sheet tin applied with lock joints and blind nailed;
3. Be ventilated to the outer air;
4. Be in an unexposed location.

TANKS.

Section 6.
Storage-tanks shall—
1. Not be installed until application with plans and specifications showing full details of location and construction of tank and all connections has been approved by underwriters having jurisdiction.
2. Not be placed—
(a) Under a sidewalk or in a sidewalk area unless it shall be shown to the satisfaction of underwriters having jurisdiction that it would not be hazardous, and that there are physical conditions that make it impracticable to install it elsewhere; nor—
(b) Inside any building that is more than one story high, or that has a cellar or a basement, unless safeguarded as hereafter specified in Section 14, and satisfactory to underwriters having jurisdiction.
3. Not having a capacity in excess of 275 gallons;
4. Be made of iron or steel at least ⅝ inch thick;
5. Be coated on the outside with tar or other rust-resisting material;
6. Have all joints tightly caulked;
7. Be tested by hydrostatic pressure to 100 pounds to the square inch;
8. Have all pipe connections at the top;
9. Be buried entirely, so that no part of the tank is less than 2 feet under the surface of the ground, and in addition to being 2 feet underground—
(a) Tanks that are to be filled by a pipe from the street shall be buried at least 2 feet lower than the grade of the street;
(b) Tanks in the ground that are within 10 feet of any building shall, if practicable, be buried 2 feet lower than the level of the lowest cellar floor in any such building;
10. Be embedded in 12 inches of Portland cement-concrete well tamped in place, and—
(a) Should there be more than one tank, they shall be separated by at least 12 inches of such concrete, and—
(b) Should an underground tank be within 10 feet of the building and not be buried at least 2 feet lower than the level of the lowest cellar floor of such building, it shall be embedded and surrounded by Portland-cement concrete 12 inches thick to top of tank;
11. Be provided with a filling-pipe, a vent-pipe, and (if not more than 30 feet from all buildings) a drawing-off pipe;
12. Be provided with an approved pump or with an approved pressure apparatus for drawing off contents;
13. Not to be placed so that the top of tank shall be below the drawing-off point;
14. May be placed in vault below first floor of building, provided—
(a) That there is no opening in the room where automobile is housed.
(b) That it is built entirely of masonry concrete, brick or stone on all sides and top and bottom.
(c) That it has two self-closing lock-joint approved fireproof doors.

THE VENT-PIPE.

Section 7.
The vent-pipe shall be—
1. Made of 1-inch or larger wrought-iron pipe, with—
(a) Heavy cast-iron fittings;
(b) Screw joints made with litharge and glycerine;
2. Connected with top of storage tank;
3. Provided with a screen of 30-mesh brass wire at or near the tank connection;
4. Carried up to the outer air, be well braced in position, and—
(a) Either capped with a double goose-neck with openings—
(1) At least 10 feet higher than roof of garage,
(2) More than 20 feet from all windows in higher adjacent buildings, and—
(3) Covered with a brass wire screen of 1-16 inch mesh;
(b) Or closed by a shut-off cock so arranged that the filling pipe cannot be opened without opening the vent, and the opening to the shut-off cock shall be—
(1) Directly over storage tank,
(2) More than 30 feet from all buildings,
(3) Covered by a screen of 30-mesh brass wire,
(4) Closed by a screw cap when not in use, and—
(5) Enclosed in a metal box, with a cover that is flush with the surface of the ground and is kept locked when not in use.

THE FILLING-PIPE.

Section 8.
The filling-pipe shall be—
1. Made of 2-inch or larger wrought-iron pipe, with—
(a) Heavy cast-iron fittings, and—
(b) Screw joints made with litharge and glycerine;
2. Provided with screens of 30-mesh brass wire,
(a) One at or near the tank connection, and—
(b) One just below the filling cock or valve;
3. Closed at the intake by a filling cock or valve, the opening of which shall be closed by a screw cap when not in use;
4. Connected with top (or with valve connecting therewith) and extend down to the bottom of the storage tank;
5. Laid at a uniform grade so that it will drain empty in the tank;
6. Carried up and terminate with the intake and filling cock or valve in—
(a) The pump-house, or—
(b) A metal box, with a cover that is flush with the surface of the ground, is kept locked when not in use, and is more than 30 feet from all buildings; or—
7. Carried up and out of the building and terminate in a covered box of heavy iron sunken at the curb flush with the sidewalk, kept locked when not in use, and in this case the shut-off valve shall be provided with a coupling for attaching the hose of a barrel-wagon, and shall also be used for receiving volatile inflammabe liquid from barrel-wagons.

PUMPS AND PUMP-HOUSES.

Section 9.
Pumps for delivering volatile inflammable liquid shall—
1. If within 30 feet of any building, be located in a fireproof pump-house;
2. Have a shut-off valve, with ground key, on the nozzle;
3. Have a check-valve between pump and nozzle;
4. Have screw stuffing-box for pump-rod;
5. Have stuffing-box for pump-rod higher than outlet of pump.

Section 10.
No pump or pump-house, unless built as hereafter specified, shall be placed—
1. In a building more than one story high;
2. In a building that has a cellar or basement;
3. In the cellar or the basement of any building;
4. In an area between a building and a sidewalk;
5. Under a sidewalk; or—
6. Within the stoop line.

Section 11.
The pump-house shall have—
1. No greater capacity than required for—
(a) Handling the volatile inflammable liquid, and—
(b) Storing the safety-cans;
2. A cement floor at least 6 inches lower than the door sill, and not more than 12 inches below the grade of the ground where located;
3. Heavy galvanized-iron drip-pans—
(a) One to cover entire floor of pump-house,
(b) One to be kept under nozzle of pump, and—
4. May be built of metal,
(a) Ventilated by four metal-covered openings 12 inches by 12 inches, two at the floor and two at the roof on opposite sides of the building.

5. If within 30 feet of a building or located in a building must be built with—
   (a) Brick walls at least 12 inches thick laid in cement mortar or reinforced-concrete 7 inches thick;
   (b) A brick or reinforced-concrete roof at least 8 inches thick covered with plaster-of-Paris not less than 2 inches thick;
   (c) Either—
      (1) An approved brick ventilating flue, or—
      (2) An approved galvanized-iron ventilating pipe;
   (d) No opening through the walls or roof except when protected by a pair of self-closing Standard fire-doors, with lock joint and with space of 1 foot between same.

Section 12.

A brick ventilating flue shall be used where the pump-house is located inside another building and shall—
1. Be built in the wall opposite the door;
2. Be lined with tile pipe, 8 inches by 8 inches inside measure;
3. Extend from the floor up to and through roof of the pump-house to at least 4 feet higher than roof of the garage;
4. Be capped with an 8-inch or larger 18-gauge galvanized-iron double goose-neck, with openings remote at least 10 feet from windows of higher adjacent buildings;
5. Have an opening—
   (a) At the floor, 6 inches by 8 inches,
   (b) At the ceiling, at least 4 inches by 6 inches,
   (c) At each end of the double goose-neck the full size of the pipe; and—
6. Have all openings protected by wire brass screens not coarser than ⅛-inch mesh.

Section 13.

A ventilating pipe shall—
1. Be made of galvanized-iron of not less than 18-gauge;
2. Be not less than 8 inches diameter;
3. Extend from 3 inches above the floor up to and through the roof of pump-house to 4 feet higher than roof of garage;
4. Be capped by a ⅛-inch or larger 18-gauge, galvanized-iron double goose-neck with openings remote at least 10 feet from windows of higher adjacent buildings;
5. Have an opening—
   (a) 3 inches above the floor, the full size of the pipe,
   (b) At the ceiling, at least 4 inches by 6 inches,
   (c) At each end of the double goose-neck, the full size of the pipe; and—
6. Have all openings protected by wire brass screens not coarser than ⅛-inch mesh.

PRESSURE SYSTEMS.

Section 14.

Pressure systems for delivering volatile inflammable liquid from storage-tanks shall—
1. Be so arranged that the gasoline will return through pipes by gravity to the storage-tank when system is drained;
   (a) Should be an approved system.
2. Be connected in a manner that will prevent the spilling of the volatile inflammable liquid, to a drawing-off cock or cocks situate—
   (a) At a permanent filling station, or—
   (b) In a pump-house.

FILLING STATIONS.

Section 15.

Filling stations shall be located at least 20 feet distant from the entrance to the garage, shall have a tight, unpierced cement or other approved fireproof floor, graded to a center, and unconnected with the sewer or drainage system of the building. The floor shall be kept free from volatile inflammable liquid by sponging or swabbing. The roof shall be kept free of inflammable vapors, either by natural or by forced ventilation.

STOVES, BOILERS, ETC.

Section 16.

No stove, forge, torch, boiler or other furnace, flame, fire, or fire heat, no electric dynamo, motor, hoist, or other exterior sparking electric appliance, and no artificial light (except the incandescent electric light) shall be used or allowed—
1. In a garage, or—
2. In any portion of the building on or below the topmost floor of the garage that is not—
   (a) Provided with an entrance on the outside of the building, and—
   (b) Separated from the garage by unpierced, approved fire-walls and floors.

Section 17.

No garage shall contain more than—
   (a) 10 gallons of volatile inflammable liquid in approved safety-cans,
   (b) 1,375 gallons (25 barrels) of volatile inflammable liquid in underground storage-tanks,
   (c) 120 pounds of calcium carbide in air-tight containers.

Section 18.

Approved safety-cans for storing volatile inflammable liquid in a garage shall be made of metal, shall be self-closing, and of a capacity of 5 gallons or less, and when not in use shall sit in drip-pans, either in the pump-house or in an approved closet.

Section 19.

All fire and lights on an automobile, or under the boiler of an automobile, shall be extinguished before bringing the same into a garage, and shall not be lit while the same is in the garage.

Section 20.

Movable incandescent electric lights in a garage shall be protected by approved metal cages, and shall be fitted with keyless sockets; all electric switches and plugs shall be permanently located at least 4 feet above the floor.
   (a) Electric charging apparatus shall not be installed in a garage equipped for handling volatile inflammable liquid until plans and method of installation are submitted to and are approved by the underwriters or municipal authorities having jurisdiction.

Section 21.

Smoking to be absolutely prohibited in any room or place in which a volatile inflammable liquid is kept, or in any room or hall opening into such room or place. A notice in large letters—"NO SMOKING"—shall be displayed in a conspicuous place and manner on all floors and at all entrances to the garage, and in all rooms and halls opening into the room or place in which a volatile inflammable liquid is kept or in which an automobile carrying a volatile inflammable liquid is kept.

Section 22.

No volatile inflammable liquid shall be—
1. Used in a garage for cleaning or for any other purpose whatsoever other than filling the tanks of automobiles;
2. Allowed to run upon the floor or to fall or pass into the drainage system of the garage;
3. Put into or removed from the tank of an automobile while any light or fire on the same is burning;
4. Carried or kept in open vessels.
5. All volatile inflammable liquids and oils recovered from the oil traps, or by swabbing or sponging up spilled liquid shall be placed in an approved safety-can of not over 5 gallons capacity. And all quantities in excess of 5 gallons shall be returned to the underground storage-tank or removed from the premises forthwith.

Section 23.

Sand shall be kept—
1. In approved boxes provided with hand-scoops, or fire-buckets, for fire-extinguishing purposes only;
2. In convenient receptacles for use in absorbing waste oil on floors;
3. In bed or metal drip-pans under each automobile kept on floors that are not fireproof.

Section 24.

Self-closing metal cans set firmly on 4-inch legs shall be kept on all floors for the purpose of holding all inflammable waste material.

Section 25.

Calcium carbide shall be kept in air-tight metal packages, which packages shall be kept at least 6 inches above the floor in a water-tight container provided with a securely fastened cover.

Section 26.

Nothing in these requirements is intended to conflict with any present National Fire Protection Association standards.
   (a) All approved devices are understood to mean approved as of N. F. P. A. standard.

W. L. B. Jenney, Architect.

WILLIAM LE BARON JENNEY was born in Fairhaven, Mass., September 25, 1832. He graduated from the Lawrence Scientific School at Cambridge, Mass., in 1853, and in 1854 entered the École Centrale des Arts et Manufactures at Paris, France. Here his career was a brilliant one, and he graduated with a diploma in 1856. It was during this period of study that an American, Richard M. Hunt, was appointed by the French Government an Inspector, and, under M. Hector Lefuel, designed the Pavillon de la Bibliothèque, opposite the Palais Royal. Mr. Jenney used to speak of the great admiration he had for Mr. Hunt at that time, and how much he was influenced in his after life by the success achieved by Mr. Hunt. During the year 1858 Mr. Jenney again visited France, spending a year and a half in the study of architecture and art. Upon his return to the United States, and upon the breaking out of the Rebellion he was appointed Captain Additional Aide-de-Camp, U. S. A., and assigned to engineer duty at Cairo, Ill.; later he served as engineer officer on the staff of General U. S. Grant, from Cairo to Corinth, then at General W. T. Sherman's request was transferred to his command and put in charge of the engineer works at Memphis. He accompanied General Sherman as member of his staff on the Vicksburg expedition; was chief engineer, Fifteenth Army Corps, at the siege of Vicksburg, and continued to serve on the staff of General Sherman until he resigned, May, 1866. In the fall of 1868 he came to Chicago and began his professional career.

His first architectural works of importance were Grace Episcopal Church, Wabash Avenue, near Sixteenth Street, Chicago; the Portland Block, corner of Washington and Dearborn Streets, Chicago, built directly after the Chicago fire, and the Mason Building.

Chicago office-buildings before the fire were poorly built, with many dark rooms, contracted halls, small entrances and few conveniences. Mr. Jenney introduced a change in his first office-buildings—the Portland Block and the Mason Building. In these buildings there is not a dark room. The entrances are attractive and the halls commodious and light. The Mason Building is a very good type of the Renaissance style that then prevailed.

Mr. Jenney's most important work, and for which he is best known, is the invention and first application of the "skeleton construction" now in such general use for tall buildings throughout the country.

In the fall of 1883 Mr. Jenney was appointed architect for the Home Insurance Company of New York City, and instructed to prepare designs for a tall, fireproof office-building, to be built at the northeast corner of Adams and La Salle Streets, Chicago, to be named "The Home Insurance Building," with the further instructions that the plans above the second story should provide for the maximum number of well-lighted small offices. The instructions further stated that the building-committee were aware that this would necessitate very small piers—smaller, probably, than were admissible if of ordinary masonry construction, unless perhaps in the upper stories.

The architect was requested to report to the building-committee the method of construction that would satisfy the requirements

for stability and for small piers. It naturally followed that if brick or stone were insufficient to carry the loads on the piers, a material must be provided that would support a greater load per unit of section. Architects had often been obliged to build an iron column into a masonry pier where the load was exceptionally great. Mr. Jenney had done the same thing, building iron columns into small piers some years before. The natural solution of the problem was to enclose an iron column within each of the small masonry piers, thus satisfying the three requirements, small piers, strength and fireproofing.

The question of a column 150 feet high, under the extreme variation of temperature, say 100 degrees Fahr. or more, from the heat of summer to the excessive cold of winter, now presented itself. A solution was soon found by Mr. Jenney, by supporting the walls and floors of each story independently on the columns, thus dividing the total movement into as many parts as there were stories, the expansion and contraction in no one story being of sufficient importance to require special consideration. The drawings were then prepared and the first design for a fireproof skeleton building was made and presented to the building-committee of the Home Insurance Company for their acceptance. As business men, they naturally inquired, "Where is there such a building?" The architect replied, "Your building at Chicago will be the first." This naturally suggested to the company the very important question, "How do you know it is good?" The architect proposed to submit his designs and calculations to one or more bridge-engineers of distinction as the company might select, the design for the skeleton building resembling, in many respects, iron railroad-bridges standing on end, side by side.

The columns in the Home Insurance Building were of cast-iron: riveted columns of plates and angles were at that time thought too expensive. It was in this building that the first Bessemer steel beams were used, manufactured by the Carnegie-Phipps Co., who stated at the time that the Home Insurance Building was the first in the United States to use steel beams in its construction. It not only introduced the "Steel Skeleton Construction" to the world, and was the first building in America to use steel beams in its construction, but it also added a long list to the requirements of a fine office-building, such as wind bracing, thorough fireproofing, rapid-running and safe elevator cars, light and well-ventilated rooms and corridors, fan-lights along the corridor side of the rooms, adding to the light of the corridor and to the ventilation of the rooms, electric plant, offices provided with tile vaults and handsome in their appointments, a system of plumbing of the highest modern type, a large, elegantly appointed toilet-room on one of the upper floors in constant charge of a janitor, a barber's-shop, etc. All these appointments are now common to all good office-buildings, but they were first used in the West in the Home Insurance Building, and many of them, like the metal elevator cars and the office vaults, were devised by Mr. Jenney for that building.

Among other prominent buildings built by Mr. Jenney while associated with Mr. Mundie are the following:

Union League Club, Horticultural Building at the Columbian Exposition, "The Fair," Siegel, Cooper & Co.'s store, the Association Building, the New York Life Building, Chicago National Bank Building, the Trude Building, and the Fort Dearborn Building.

The last work in which Mr. Jenney was actively interested was the designing of the Illinois Vicksburg Memorial, a monument constructed by the State of Illinois on the battlefield of Vicksburg. Mr. Jenney was naturally very much interested in this work, having taker a very active part in the siege. At the time the monument was dedicated, Mr. Jenney was, unfortunately, too ill to attend. Mr. Mundie took up the work where it was left by Mr. Jenney and carried it on to a successful completion.

In the spring of 1905 Mr. Jenney retired from active practice and concluded to make his permanent residence in Los Angeles. The business has since then been carried on under the firm name of Jenney, Mundie & Jensen, by Mr. W. B. Mundie and Mr. E. C. Jensen, who had been associated with Mr. Jenney for twenty years.

The Column of Trajan

RECENTLY, at King's College, Commendatore Boni concluded a course of lectures by an address on recent discoveries regarding the Column of Trajan, illustrated by a series of beautiful slides. Commendatore Boni said that up till recently it had been believed by archæologists that the column had been erected to indicate the height of a hill cut away in order to level the area for the Forum Ulpium, but that view did not seem to him to accord with the writings of ancient writers. Ancient writers told them that three years after the column had been built Trajan left Rome for an expedition and died, and was cremated, and his ashes were collected and placed in a golden urn and buried in a sepulchral column. Looking at the bas-reliefs around the base of the column they seemed to him to represent the acts of a people after the funeral of a hero. A number of slides of the bas-reliefs around the columns were shown, and the lecturer commented on the various scenes depicted of the passage of the Roman army to the Danube and the crossing. Modern topographists had said that the column could not be sepulchral, as there were no traces of a funeral chamber, but last year his attention was attracted to the loophole window on the southern side of the pedestal, like those admitting light into the spiral staircase, and on examination he found that this had been walled up inside. He noticed also that part of the base, which was decorated with a beautiful wreath of laurels, had been broken away; and on closer examination it appeared as if a violent blow had been given to the top of the base. They knew that a bronze statue of Trajan formerly stood on the top of the column, and that in the XVIth century a colossal head of Trajan was found, but which had since disappeared; and the conclusion he arrived at was that in early mediæval times the statue shared the fate of many statues which stood on the summits of the arches, and of other monuments of Rome which were pulled down and taken to Constantinople, or put into the melting-pot and made into church bells or pots and pans. Following out this hypothesis, he searched the foot of the pedestal to see if he could discover any fragments of the torus. A grotto had been excavated at the base of the column, probably in the Middle Ages, for the purpose of searching for hidden treasure, and on searching he found the missing fragments of the torus. The lecturer showed a photograph illustrating how he had constructed the fragments, and added that he had securely bound them together so that they might not be transported across the ocean. A most interesting photograph was also exhibited, taken vertically from the summit of the column, from which a clear idea could be gained of how the statue had fallen down and struck the base of the column, knocking off the fragments which had now been discovered. Proceeding, he said he afterward penetrated the grotto and discovered a number of human skeletons, the skulls being like those which came out of the Catacombs. From other indications there was no doubt but that buildings existed before the column was built. In the IXth century, also, a church was built against the column, and they had curious documentary evidence of this in the grant by the monks of land to peasants. Having filled up the grotto, he turned his attention to the entrance, and in the inner vestibule at the base of the column found there were still visible traces of a door which had been walled up and plastered over. He removed the plaster and cut away part of the masonry, and found that the door led into a small atrium, turning to the right, where a second door was discovered. This second door led into a chamber 10 feet long, 5 feet wide and 6 feet high, which was the funeral-chamber. On the outer wall of the chamber were the bricks which closed up the loophole which had first attracted his attention on the outside. Within this chamber were the remains of a funeral-table 2½ feet high and 4 feet wide, and just above the table in the marble wall of the chamber holes had been drilled in such a way as to suggest that clamps going out from the wall had supported on the table two urns, one toward one end and one toward the other end of the table. An inscription still preserved in the Vatican Lapidarium stated that Hadrian had erected a temple ***parentibus suis***, in honor of his parents, Trajan and Plotina. This temple had stood close to the column, and as it was the custom to erect such temples close to the burying-place of the persons in whose honor they had been erected, the natural conclusion was that the chamber was a sepulchral-chamber and that the table had supported two urns containing the ashes of Trajan and his wife, the parents of Hadrian. His conclusion was that the main object of the column was plainly that of a sepulchral monument. Now they had to deal with the inscription, the old interpretation of which was that it indicated the height of the hill which by so much labor had been cut and carried away. The inscription read: "AD DECLARANDVM. QVANTAE. ALTITVDINIS. MONS. ET. LOCVS. TANTIS. OPERIBVS. SIT. EGESTVS." And he certainly did not think it confirmed the

theory of the cutting away of a hill. He began to analyze the theory, and on making careful trigonometrical calculations of the height of the column he found that it was a *columna centenaria*, exactly 100 feet; so exactly, indeed, that by means of it the length of the Roman foot could be ascertained with greater precision than had hitherto been reached. Was it possible that any hill should have exactly reached this height? He thought it was not; but, further, he felt that if this was the case geological evidences of the fact could be found. Ancient authors, in their references to the Forum Ulpium, had made use of such expressions as seemed to exclude quite decisively the existence of any hill on the spot now occupied by the column. To try and get evidence he made a series of excavations in the vicinity and also across the whole width of the valley occupied by the Forum Ulpium. He found that on the level which would have been formed if the hill had been cut away there were not the geological strata which in that case would have been laid bare, but remains of early Imperial and Republican works, such as roads, foundations and drains. Having ascertained that through the whole length of the valley there was no geological strata, he went back to an old hypothesis of his that the ancient walls of Rome were not of the time of the kings, but of the older Republic. In the old maps they found the walls crossing the valley, and an analysis of the materials seemed to prove, to his mind, that the walls were early Republican. Especially interesting were the unmistakable traces of a wall made of blocks of tufa, exactly like those used in the fortifications still extant on the adjoining slopes of the Quirinal, and these were no doubt the remains of the fortifications which they knew, from Livy, to have been built in the fourth century B. C., on the retreat of the Gauls. He though that decisive proof was afforded that long before the column was put up the valley between the Quirinal and the Capitol had been practically a level plain, with no hill upon it. Further, if any hill had ever existed there, it was improbable that the Senate would have commemorated a work done by another people under another Emperor. With this evidence before him he turned his attention again to the inscription, and suggested that it did not, as had been supposed, refer to the altitude of a hill which it had been necessary to remove, but to the height and noble proportions of the buildings that had been erected not only on the level of the Forum Ulpium, but also on the slope of the neighboring hill. It was to afford a view over the Forum and these buildings that the spiral staircase had been constructed inside the column and a standing place arranged at its summit, where stood the bronze statue of the Emperor. In conclusion, Commendatore Boni said he was going back to Rome to resume his explorations, but he could not leave before thanking them most warmly for the interest they had shown in his lectures.—*The Builder.*

Pittsburgh High School Competition Scandal.

IN connection with the long-drawn-out and disagreeable dispute over the competition for the Pittsburgh High School building, the Pittsburgh Chapter, A. I. A., has issued the following statement, addressed to the public:

OWING to the miscarriage of the first competition instituted by the Central Board of Education for the selection of an architect for a school building proposed to be built on what is known as the "Magee site," and the consequent charges of unprofessional action on the part of some of the architects taking part therein, who are members of the Pittsburgh Chapter of the American Institute of Architects, said Chapter has carefully reviewed the testimony given before the Central Board of Education and other papers pertaining thereto, and deem it their duty to present their findings to the tax-paying public for their consideration. These findings are as follows:

On February 12, 1906, a building-committee was appointed, having the usual powers of such committees.

On May 8, 1906, at a regular meeting of the Central Board, the building-committee, through its chairman, submitted to the Board a report under the above resolution. In the report occurred the following statements as to the importance of the selection of an architect:

"The most important feature connected with our labors is the selection of an architect who will not only prepare proper plans and specifications, but who will carry the work to a successful and satisfactory conclusion. The architect's position gives him virtually absolute power over the expenditure of the building-funds. Contracts rest upon plans and specifications. The architect makes these and interprets them, and his opportunities for dishonest collusion with the builder and sub-contractor, whom he may either oppress or favor, are numerous and profitable and beyond successful detection. His integrity must, therefore, be above suspicion, and that he should have the requisite knowledge and experience goes without saying.

"If you should select an architect in any other manner than by competition, each member may have his voice; several architects at least are certain to have strong indorsements from individual supporters, and it will be virtually impossible to select one without apparent injustice to others. A competition puts the whole matter on an impartial basis; it requires the architect to prove his right to the appointment by showing his superior skill; it utterly eliminates the question of favoritism.

"It is necessary that the committee should have technical help in arranging and deciding the competition; not that the professional adviser should have control of its decisions; only that he arrange the conditions, in order to permit the best results, and explain the exact nature of the result to the members, in order that they may know the relative merits of the designs before making an award."

The committee proceeded to recommend the selection of an architect by competition, and that a competent expert be employed to serve "as professional adviser to the building-committee, whose duty shall be to make a proper study of conditions and of requirements affecting the proposed building, to prepare instructions to the competing architects, to govern the conduct of the competition, to examine designs submitted in competition, make explanation thereof, and give his judgment of their merit," and to consult with the committee during all stages of the competition.

The report proceeds:

"Fourth. We have selected as professional adviser a gentleman who has had vast experience in such matters, and whose reputation as an expert in this line of work is of the highest order. From the standing he occupies in his profession we are satisfied that his assistance to us will be very valuable, and aid us in erecting a building which will be a credit to all concerned."

This report was unanimously adopted by the Central Board.

On September 11, 1906, two members made a series of amendments to the report of the building-committee adopted May 8. The Chair ruled these out of order under the by-laws in force. Appeals were taken and sustained from the Chair's decision, and amendments passed to the programme for the competition, the effect of which was to wipe out all of the effective work on the part of the professional adviser and all of the power of the building-committee, excepting to express their preference in regard to designs.

Notwithstanding this, the building-committee expressed its purpose to proceed with the original programme, whereupon two members of the Central Board of Education filed an appeal in the Court of Common Pleas No. 1 to enjoin this action and to permit the whole Board to take charge of the matter and select an architect at their pleasure, as provided in the above-mentioned amendments.

The Court refused the injunction and dismissed the appeal.

The building-committee therefore proceeded with its programme until November 21, 1906, when they adopted as premiated the plan chosen by the professional adviser as being the one "better than any other in the competition; the best scheme in regard to the safety of the public and pupils; on the whole, the most complete, the best adapted for future extension, very economical in construction and distinctly the best."

The building-committee recommended this plan for adoption by a vote of 8 to 2, two members opposing the recommendation on the ground that the authorship of the plan was known. This charge had been brought before the committee and the professional adviser, and had been fully and thoroughly discussed by them before the recommendation was made, and the charge was declared to be unfounded, the adviser stating that "nothing has been offered sufficient to warrant the exclusion of the competitor from the competition. If the committee votes to exclude, it makes itself liable to the competitor excluded."

These charges were then fully and thoroughly investigated by the Board, and it was declared that they were not sustained.

The Board refused to adopt the minority report, which disqualified the premiated design by reason of having violated the rules of competition, by a vote of 18 yeas to 23 noes.

The majority report, recommending the premiated design and naming its authors and architects, failed of the majority required

for action by a vote of 21 yeas to 20 noes, twenty-two being a majority of the entire Board.

The following is worthy of consideration:

First—The report of the first building-committee recommending a form of competition as fair, as had been published, was unanimously adopted by the Board.

Second—A concerted objection was made to said competition on September 11, 1906, when amendments were proposed which emasculated said programme.

Third—That when these amendments were declared null and void by the Board's solicitor, a bill of equity enjoining the action of the building-committee was filed, and this injunction was refused and dismissed by the court.

Fourth—That when the award of the competition was made by the building-committee and their adviser, and recommended to the Board for their adoption, this recommendation was opposed on the ground of a charge of unprofessional conduct on the part of the successful competitor.

Fifth—That this charge was investigated and declared unfounded both by the building-committee and their professional adviser and by the Board itself.

Sixth—That while the Board might fail under the terms of the programme to approve of the recommendation of the building-committee, "for any cause whatever," yet the programme provided, in the event of their failure to approve the design recommended, that they should then proceed to consider the next best design submitted by one of the competitors.

Seventh—That instead of thus proceeding, the Board has discarded the entire original competition, has appointed a new building-committee, and has held another competition for the selection of an architect for the work, the following being the text of the new resolution:

"RESOLVED, That the president of this body be directed to appoint a committee of nine, to be known as the building-committee.

"This committee to procure plans, in open competition, from all competent architects who may wish to submit plans, for a High School building, to be erected on the property owned by the Central Board of Education, and known as the Magee site.

"The building to be modern in every respect, and to accommodate at least 2,000 pupils, with provisions for future extension.

"The sum of $5,000 to be paid, in such amounts and according to their merit, as determined by the committee, to the architects submitting the best plans.

"This committee to procure actual estimates or proposals from builders upon the plans to be recommended by them, in order to ascertain the total cost of the building, which is not to exceed the sum of $1,200,000.

"The detail matter pertaining to the competition to remain with the building-committee, who are to report to the Board in the shortest possible time."

It is only necessary to contrast this final action with the initial resolution, with which this report commences, to observe the true scope and purpose of the whole series of actions which have been directed against the recommendations of the professional adviser. Whatever importance may be attached to the various details of the testimony, or the proceedings, the fact remains unquestioned that the high declarations of a purpose to secure an architect by the most approved methods of competition, regulated by the highest professional authority, and thus relieve the Board of all suspicion of corruption in the putting out of such large sums of public money, have been thrown to the ground; all the precautions taken have been wiped away, and even the minor limits as to the commissions and expenses to be paid to the architect abolished.

It is evident by a comparison of the report of the first building-committee and the resolutions creating the new building-committee, by whom the second competition has been held, that the latter possesses unlimited possibilities for favoritism and unfairness.

Eighth—That a member of the Central Board busied himself learning about the designs of architects, and told another member.

Ninth—That since the programme provided that no architect should divulge the authorship of his design, it with equal force implied that members of the Central Board of Education should not seek to ascertain this information.

Tenth—That the adviser did not know the authors of any of the designs when he designated his selection.

Eleventh—That the names of authors of other designs than that premiated were apparently known to certain members of the Board before the opening of the sealed envelope containing this information.

Twelfth—That the same men who voted for the amendments to the emasculated programme have, with few exceptions, voted together since that date.

Thirteenth—That some motive, unknown to us, has actuated a group of members of this Board to follow out a plan with unusual energy and in such a manner as to indicate a fixed determination, the total result of which is manifestly contrary to the interest of the tax-payer.

ILLUSTRATIONS

HOUSE OF CLAUDE MEEKER, ESQ., BULLETT PARK, COLUMBUS, O. MR. F. L. PACKARD, ARCHITECT, COLUMBUS, O.

HOUSE OF LEWIS H. LOZIER, ESQ., QUICK AVENUE, RIVER FOREST, ILL. MESSRS. TALLMADGE & WATSON, ARCHITECTS, CHICAGO, ILL.

HOUSE OF MRS. J. R. STEERS, GREENWICH, CONN. MESSRS. BLAKE & BUTLER AND CARRÈRE & HASTINGS, ASSOCIATE ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

The exterior of this house is entirely of concrete, the walls being of hollow concrete blocks and the columns and balustrades also being cast from concrete. An effective coloring has been secured by introducing a mineral pigment into the outer layer of concrete. In this way an agreeable pinkish blush has been made to replace the disagreeable, cold tone of ordinary concrete finishes.

HOUSE OF GEORGE M. LOUGHLIN, ESQ., WOODLAND ROAD, PITTSBURGH, PA.
MESSRS. M'CLURE & SPAHR, ARCHITECTS, PITTSBURGH, PA.

HOUSE OF MRS. WILLIAM THAW, PITTSBURGH, PA. MESSRS. BEEZER BROS., ARCHITECTS, PITTSBURGH, PA.

HOUSE OF S. EASTMAN, ESQ., KENILWORTH, ILL. MR. G. W. MAHER, ARCHITECT, CHICAGO, ILL.

Additional Illustrations in the International Edition.

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NOTES AND CLIPPINGS

WIND PRESSURE.—Mr. Stanton and Mr. Bairstow have made some experiments at the National Physical Laboratory which bring out a new and practically very valuable fact—namely, that pressure is not the same on large surfaces as on small experimental models. If, for example, a given wind velocity is brought to bear on a square foot of surface it will be 18 per cent. less per square foot than if it were directed on 100 square feet of surface. It was demonstrated, too, that this relation is constant for flat forms, however complicated. A builder or engineer who knows that a structure may be exposed to a wind of eighty miles per hour and that the pressure per square foot as determined by model in, say, *x* pounds, should allow for his larger construction 20 per cent. extra. The reason for this seems to be the more thoroughly reduced pressure on the lee side of a larger area.

Many years ago the Royal Meteorological Society arranged an exhibition of apparatus for measuring wind velocities. It was an extraordinary assortment of instruments, of which one only, and that a purely empirical design, seemed to achieve the object—the well-known Robinson's hemispherical cups, invented by a clergyman. So everybody made up his mind that the thing could not be done scientifically. Straightway Mr. Dines, F.R.M.S., went and did it. Is that fair to your colleagues to go and do a thing which they have voted impossible? Mr. Dines has been "at it" again lately, and in this race, we believe, Dr. W. N. Shaw, the meteorological director, is in the conspiracy. That remarkable instrument the barometer is subject to curious fluctuations, apart from the ordinary steady rise and fall, little undulations caused by sudden changes, and by such simple things as the presence of a cloud over the locality. These oscillations are so minute that nobody ever thought they could be indicated on a barograph—the chart which records the movements of the mercurial column. Nobody, that is to say, but Mr. Dines, who, at the instigation of Dr. Shaw, has invented a strange piece of mechanism, which actually does register these minute variations—the "embroidery of the barometric chart," as the director calls them—and so produce a microbarograph.—*London Telegraph.*

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SOCIETIES, PERSONAL MENTION, ETC.

ASSUMING that the verbatim report printed in the Philadelphia papers of the evidence given before the Capitol Investigation Commission by Mr. George Gray Barnard, sculptor, is essentially complete and accurate, we have thought it worth while to reprint it at length in another column. It is an interesting, and in many ways a pathetic story, but it is such a story as could be told only of or by an artist. After reading it, one can understand why the Philadelphia *North American* calls the architect of the building a "villain"; but this term seems rather needlessly harsh, when the manners and customs of our day are taken into consideration. There is abundant testimony that the architect was vain, bombastic, unmanageable, tricky and essentially dishonest from start to finish, but his misdoings seem to be the natural actions of a man brought up in a "political atmosphere," and if we begin to characterize political misdoings accurately, where can we stop if we begin at once with villainy. It is impossible to believe that the sums filched from the treasury in such barefaced fashion rested finally in the hands of the architect or the contractors. We cannot but feel sure that, had Mr. Charles E. Hughes, with his wonderful prescience, his inexplicable knack of knowing in just what account-book he would find the evidence he needed, been the examining attorney, he would long before this have found out how contractors and architect "checked out" their ill-gotten receipts and traced the passage of the money step by step till it reached the hands of the "ward-heelers" whose work is so needed to keep the Republican machine in power.

THE whole scandal has one very important effect: it centres the attention, not only of the public but of architects as well, on the reality and magnitude of the responsibility that rests upon the architect as the agent of his employers, and no one can say whether this enlightening will be helpful or prejudicial to the profession. It is as possible for the ill-disposed and disbelieving to argue that the revelations show that, as they had always held, architects do magnify the cost of their undertakings for the sake of increasing their commissions, as it is easy for the sensible and well-disposed to acknowledge that they see, more clearly than ever, how an honest and efficient architect can stand between over-greedy contractors and their own bank-accounts.

OUR attention has been drawn to the fact that someone's "publicity bureau" is seeking to promote its employers' advantage by making it appear that the *American Architect* disbelieves in and disapproves of reinforced concrete and the various methods in which it is utilized in building operations. In the arsenal of crooked dialectics there is no weapon that shows evidence of such constant use as the garbled extract, and it is by quoting in dissociation from their context some of the words we actually have used that we are made to appear hostile to an unquestionably useful material and method. Attentive readers of this journal know what our position really is, and we have no desire to recall or change anything we have written, even though it now appears that some of our words of advice and warning can be made to take on an actually hostile air. We have felt that there were quite enough persons with "vested interests" at risk engaged in zealously promoting, with not too great discretion, the rapid introduction and general use of the new method of construction, and that we could do more honest service to everybody by insisting that certain important peculiarities and properties must constantly be borne in mind. We are quite willing to affirm repeatedly that the safe usage of concrete hinges absolutely on the uninterrupted completion of a definite chemical reaction; that, though fairly fire-resisting, it is not in itself fireproof; that its action in contact with heat depends largely on the nature of the aggregate; that, at every stage of its use, it requires the constant watchfulness of a skilled and conscientious inspector; that the belief that it can be handled by cheap and unskilled labor is fallacious; that more than ordinary leisureliness in taking the several steps in applying the material is desirable, since the greater number of accidents are directly traceable to unwise haste in striking centres and removing supporting forms; that the alteration or removal of reinforced-concrete building will be a difficult, dangerous and expensive process; that the successful artistic and architectural handling of the material is likely to result only from prolonged actual experiment, and that the early users of

the material will, later, wish that they had waited longer. As to the dangers accruing from electrolytic action, we probably know less than many others, but, in so far as all buildings in which metal beams and columns are used may be subject to the mysterious and accidental effects of wandering electric currents, we believe that the danger in reinforced-concrete buildings is greater than in the steel-skeleton buildings, owing to the smaller cross section of the metal used and the lesser relative superficial area on which the fluid can act. But, finally, we are entirely satisfied that skilled workmen, working under the intelligent direction of men who have really studied and mastered the virtues and defects of the material, can invariably accomplish safe and satisfactory results.

IT may be recalled that when, a couple of years ago, we drew attention to the need there was that the city of New York should care properly for its school-children by erecting "recreation buildings," our remarks drew out an interesting letter from Dr. L. H. Gulick, Physical Director of the Public Schools, in which he said he had long entertained the same feeling, and had actually made some effort to bring such buildings into being. It now seems that, though nothing has been decided upon, Dr. Gulick and his advisers have not been resting on their oars, for at the first annual meeting of the Playgrounds Association of America, held last week in Chicago, Dr. Gulick, the president of the Association, developed his views in an interesting paper and, further, explained that he had already induced Mr. C. B. J. Snyder, architect to the Board of Education, to prepare the drawings for a twenty-story recreation-building, about one hundred by two hundred feet on plan, to be erected somewhere on the lower east side of New York, where the school-population is dense. This building, properly equipped, he finds would cost some two million dollars, and hygienists, sociologists and philanthropists will feel that the good derivable would justify even so great an outlay.

THE school question in all cities, but particularly in New York, is one of the first importance. Much as New York has done in the last ten years, and pledged as Mayor McClellan is to do all in his power to provide abundant school room, the present indications are that it is not possible by following the present system ever to overtake and provide for the steadily increasing school population, the greater part of which springs from sources not affected by the race-suicide idea. It seems to us that New York would do well instantly to take up and develop the idea that, for some little time, has been urged in connection with the schools of Boston, a city much more favorably situated than is New York, where it is suggested that future schools shall be built, not in centres of dense population, but about the outskirts of the parks, where the children may have better air and playgrounds and the benefit of better physical surroundings. For New York, the advisable thing to do seems to be to cease building elaborate and costly school-houses on over-expensive sites on Manhattan Island, and, instead, to procure, somewhere along the line of the Long Island Railroad, within ten miles of the City-hall, a tract of five thousand acres, and upon it build all the school buildings needed by the city for the next century. As fast as the new buildings can be prepared, enough boys to fill them should be drawn from the grammar and high-school grades in the old buildings, and the buildings thus emptied could be assigned to the use of girls and the primary schools. It is no new thing for boys living in one town to travel miles, daily, to schools in another town, and New York boys would not object to the slight fatigue and irksomeness of car-travel, when they have as compensation the benefits of an outdoor freedom and spaciousness they never dreamed of. The present school-buildings would supply all the space needed by girls and children for many years, and the saving in the cost of new building sites on Manhattan Island would go far to provide the running-cost of the municipal school trains that the city would have to provide. The great gain, of course, of such an undertaking would be the physical and moral bettering of the growing generation.

THE New York Court of Appeals has just sustained the verdict rendered in favor of certain fire-insurance companies against the New York Edison Company, to which we referred last December. The effect of the decision is that where fires result from defective wiring the insurance company, which of course has to pay the loss, if the property was insured, is now allowed to sue the light or power company whose wires caused the fire and recover such part of its disbursement to the insured owner as the evidence may seem to justify. The insurance companies are too useful servants of modern civilizations for one not to rejoice that an inequitable burden is to be lifted from their shoulders, now and then; but the general public who share this feeling must understand that, if the light-and-power companies are going to be forced to recoup to the fire-insurance companies the twenty-five millions the latter pay out annually because of defective wiring, the former can provide their own exchequers with the needed sum only by raising prices to the consumers of electricity. It is the old story of robbing Peter to pay Paul, and, as usual, it is the innocent and uninterested third party that has to submit to the robbery. The same sort of forced contribution will be levied on the general public in case Judge Landis shall decide, as he has the power to, to fine the Standard Oil Company twenty-nine million dollars. The Standard's treasury would be quickly refilled by the simple expedient of marking up the price of oil five cents per gallon.

FIRST and last, many people have to suffer at the hands of the proof-reader, but it is particularly irritating, when the *American Architect* has always consistently adhered to the original spelling of the word aluminium, that on the only occasion we have made to recommend its general use in place of the modern spelling, as we did in our issue for June 29, the proof-reader should have perverted the meaning and forced us to endorse the spelling we actually meant to reprehend, a spelling that is as abominable, so far as euphony goes, as would be "chromum," "strontum," "sodum," or "calcum," words a chemist would hardly recognize.

How the Sculpture for Pennsylvania's Capitol Was Not Procured

ONE of the most disagreeable of the many unpleasant features of the Pennsylvania Capitol scandal is the manner in which Mr. George Gray Barnard, sculptor, was treated by the architect of the building, and, as part of our record of the case, we have reproduced the most interesting portions of the testimony given by Mr. Barnard last week before the Capitol Investigation Commission.

In the first part of his recital, says the Philadelphia *Press*, Mr. Barnard told of being summoned to Huston's office and of his conversation with him regarding the work. He planned out all the groupings in a few minutes, he said, and gave his reasons for depicting human emotions in his marble figures. On hearing this the architect promised $700,000 for the work.

The sculptor then went on to tell of the events which led up to his finally agreeing to do the work for $100,000, and how Governor Stone had stood by him when he asked to have his bond reduced from $50,000 to $20,000. The bond was furnished by a Baltimore bonding company, which not only demanded the sum of money which was the State's first advance to Barnard, but took his two works of art as security and compelled him to insure his life for $25,000.

Mr. Barnard then went on to tell how Huston, in accordance with the contract, sent him $10,000 a month, but soon began to withhold payments, so that the sculptor was without funds, in debt for the building of his studios and with his workmen clamoring for their pay.

Huston visited Barnard in February of 1903 and then, according to the sculptor, contracted to buy the "Prodigal Son" for $25,000.

Of the subsequent visit of Rev. S. C. Huston, the architect's brother, Mr. Barnard said:

"He came over in August. He said: 'You didn't take it seriously about that "Prodigal Son"?' I said, 'Yes; go look at it,' and he did. 'Good heavens! Barnard,' he said, 'this will never do in the world! My brother is an enthusiast about your work; he just said it enthusiastically; he never intended you should go ahead and do this for $25,000.' He went ahead and told me a story to illustrate it, which I will not tell you.

"I set to work again; but, not having any money and being frightfully upset by what had passed—by the strain on me in every way—I felt things were going slowly, and I could not go on—my brain would not go on—I was done for. So I closed up my studios and went to Switzerland, where my wife was. I was entirely broken down, and had to stay in bed there for two weeks. While in bed there I got a letter from Mr. Huston, in which he said: 'I forbid you, as official architect, to make any movement toward carrying out the plaster casts in marble, until I see all of the plaster casts up in their places, completed—all the plaster casts of the groups and bas-reliefs up in their places, completed.'

"I said to my wife: 'I haven't had any money for six weeks. They haven't written to me; his brother has come over to tell me this, so there wouldn't be anything on paper; rather than write or cable he has come across the ocean. And now I have had no money for six weeks, and I know the whole business now. I have done these figures; they are the nude form. They are covered in one way, so that there will be nothing shocking about it; but they are the human form. But he has gone back, and I have sent over a whole lot of photographs, and he has told me the politicans do not care about sculpture, and that it would hurt their morals if they saw a nude leg of a man, perhaps. And now they are going to close me off, and all this effort of mine is going to ruin.'

"I thought perhaps the politicians would say, when they saw the statues, that they were not what they wanted; they wanted some workmen with spades, and so on. So I cabled and said: 'Answer me if you care anything about my life and about this work, and answer me, is it because the statues are nude, or what is the matter that you do not send money and have ordered me not to go on?'

"He never answered. I wrote him letter after letter, when I was in my bed sick there; I wrote him every three days; I could not help it. I went on another month. I stayed there August and through the month of September, and I did not get an answer. I went then to Moret, my wife with me, and we were all pretty well done up—and there was no letter from Huston. I sat down and cabled him again. I don't know how much I spent in cables, but it never did any good.

"I sat down and wrote him twenty-one questions. I wrote all these questions: Is it because of so and so, or is it because of so and so—covering every ground. I could not understand why in the world my money was not sent me and why he had sent me a letter saying that I was not to do anything in marble. And, mind you, my plaster casts of the first group had just been shipped to Italy and they were just beginning to work on them. But he never answered.

"This thing went on until the first day of December; then the whole money was sent me at once. The check came the 1st of December. My men were going on with the work, but all without pay. Well, then I paid them all up; but it cost me more. I have been insured for from $60,000 to $100,000 on those plaster casts, according to my contract.

"Then the month of December passed and the first of January came, and no money; and I had to turn my studios, that cost me $6,000, over for the rent, because the last hour of the year I had nothing to pay my rent with and they gave me notice to quit the house, and I could not do it, and I had to give them these studios. They went for $100. I had to give them the $6,000 for $100 to pay my rent.

"Then, in the month of February or March, Mr. Huston came over with a committee of five or six gentlemen. I think Mr. Sanderson was one of them; and there was the artist, the painter, there was Mr. Van Ingen, the man who furnished the bronze, from New York. There were six of them. They all came to see my work, and they were all delighted. When they first arrived I was not very happy. I did not want to see Mr. Huston; he had caused me such agony. But he tried to make amends for it. He said it was all a mistake, and he said he had never written this letter that I accused him of.

"I said: 'You did; you wrote me that letter and you left me in this state.' He said: 'I never wrote such a letter in the world.' I said: 'What will you do if you find such an order?' 'Anything you wish,' he said; 'I will make amends, because there is no such thing in existence.'

"We went to the house and I showed him the letter in typewriting, saying, 'I forbid you carrying on anything in marble until they are all in their place in plaster.' He said: 'Oh, that was the office-boy that did that; I told the office-boy to tell you to put them in their places in the old grange.'

"Well, I forgave him. They took me to Paris and gave me a big dinner; and they talked of my work and praised it, and, of course, I felt better. I remember that at five minutes of 12 o'clock Huston took out his watch and he said: 'Gentlemen, it is just five minutes of 12, and I want to say that if I could sign my name to any one of those statues down in that old grange in Moret I would give my life up to-night. Mr. Barnard, that will show you what I think of your work and how I feel about your work, for, I know, to have done one of those statues means immortality in reputation. No man can say more than that.'"

Then came perhaps the most pathetic part of the story told by the sculptor, who was duped by Huston. For fourteen months, he said, from late in 1905, he was without money because Huston held up payments. For three months his workmen had served without a penny's pay, feeling that the American Government was in some way behind the work. For five months longer they worked, then in July of 1906, the sculptor being reduced almost to starvation, Barnard went to the south of France and gathered curios, which he sold to dealers to get money to pay his men. In this way he raised $20,000. Continuing, he told the committee:

"Just before the dedication of the Capitol I learned that there had been trouble with some chandeliers, and then so much money for a model of a chandelier that I would have done for a hundred dollars. The thing went on until last May, or a month or so ago, and I commenced to realize more and more why Mr. Huston had stopped my money.

"Here had been fourteen months that I was without money, and twelve months of those I spent in the southern part of France collecting antiques in order to make a living. I have been in almost every village and almost every yard in France collecting fragments of broken cathedrals and taking them to Jew merchants in Paris and selling them for what I could get. I made enough money out of that so that I was able to send my wife and children over and come over myself, and also to settle up all I owed.

Every man I owed was paid. They said they would have waited until the end, and Mr. Bailey had been asking me to come over and we could fix it; but I could not fix it, and I could not leave all those men. I had six studios full of things; but I settled all up, and here I am, and there is your story.

"I saw in the papers that the State was going to vote me $25,000, and I cabled over that I could not accept it under any conditions. I have never asked any money from Mr. Bailey all this time, except the $7,500 that I said I ought to have. I had to pay $5,000; I had to pay my men. They were new moulders. I went out with my antiques and I made enough to pay the $5,000 for those duplicate casts, making the money in the way I have stated. Mr. Bailey said that the State would not be responsible for the money and that I would have to see Mr. Huston. I did write to him, for I thought the architect was responsible. He represented the State, I thought.

"I said, 'Unless you send me $7,500 you will never get my sculpture.' No, I did not say $7,500; I only said a part of it. I said, 'I will take $4,300 for the actual work done, without extras, the absolute cost. I said, 'You send me that; it must be paid,' and that is all I wanted.

"I did not want the State to vote me extra money. The cruel thing about this matter is this: That marble group is being finished in Italy, for me to work at, and there has been $13,000 in the treasury here to pay it, kept from me for the sake of the $2,000 that was due them. That work has been twelve months lying there and those men without their money. I could not understand why they kept that $13,000 back. I was losing time and could not be working at it.

"And then, as I told you, that fourteen months that I spent in snow and ice! If I could only have had that fourteen months added to my life I could have accomplished something, don't you see?"

Worst of all, though, in the sculptor's estimation, was what he had to give up in France that he might devote the rest of his life to work for his country. After his first group was completed artists and critics were invited to his studio, and they were amazed at the beauty of what he had to show. The French Government at once offered to buy seven figures for the Luxembourg Galleries.

"I was offered everything to stay in France," the sculptor said in concluding his tragic recital. "I was offered the cross of the Legion of Honor and a magnificent studio, with a garden and orchard attached, if I would only stay. But I declined all these honors, saying: 'I have learned my art, and now I am going back to work in and for my own country.'"

Suburban Dwellings in Concrete

THE committee appointed by the Association of American Portland Cement Manufacturers to judge the designs for suburban dwellings in concrete submits the following report:

THE committee has observed in all respects the conditions of the competition programme issued by your association. The designs when received by the committee from your secretary were designated by numbers, and with the exception of one, which was excluded, bore no distinguishing mark or device in any way affecting the anonymity of the competition. The designs have at all times been known to us only by these numbers, and the premiated designs are so designated in this report, without knowledge on our part of the identity of their authors.

After careful consideration of the designs and their explanatory statements, the awards have been made with regard to, first, excellence in artistic quality; second, convenience of floor arrangements, and third, economy of construction. We have endeavored to give proper value to the use of concrete in its various forms as applying to the subject of the competition.

The number of designs submitted in the several classes is as follows:

Class A1	42 designs
Class B1	13 designs
Class A2	37 designs
Class B2	9 designs
Class A3	85 designs
Class B3	21 designs
Excluded	1 design
Total	208 designs

Many designs had to be set aside as being not only too costly, but also not adapted to such diminishing (which might be described as "photographing down") as would render them possible for the sums named.

We have found a very general lack of familiarity with possible surface finishes and textures in concrete and the methods of securing them. Some of the best designs have fallen short in this respect. A great number of the designers have appreciated the necessity of extreme simplicity of exterior treatment in monolithic construction, while others, whose designs in monolithic construction have many points of excellence, show lack of practical experience by the use of too many corners, angles and projections.

The specifications have in many cases been less complete than we could have wished, but on the whole answer the requirements of the programme.

We have no hesitancy in reporting that the competition has been productive of an entirely satisfactory result in the high grade of a greater proportion of the designs than would be naturally expected.

In stating the awards, we would venture to add notes critical and suggestive, which we trust will be helpful to the authors.

AWARDS.

CLASS AI.—SINGLE DWELLINGS, NOT TO EXCEED $2,000.
FIRST PRIZE ($100). DESIGN NO. 158.

This design is most admirable, having a distinct, individual charm in both plan and elevation. This applies particularly to the arrangement of the entrance, stairs and living room. The use of a single chimney is economical, as is also the simple outline of the exterior walls, the recessed panels of which can be readily formed in monolithic construction by boards nailed to the inside of the forms. The drawings are exquisitely rendered. The specifications designate rough-cast finish for the exterior walls. This is a questionable surface treatment for concrete, as plaster of any thickness is likely to peel, from dampness and frost. However, the surface treatment might be readily modified.

Of this design the successful author, Mr. Eugene Ward, Jr., of New York, furnished the following description:

DESCRIPTION.—Outer walls and porch posts to be of monolithic concrete construction. Cellar and porch floors to be of concrete. Outer walls to be eight inches thick, cemented on the outside and furred with wood furring strips and plastered on wood lath on the inside. Outside walls to have rough-cast finish, stained. Chimneys to be lined with flue tile. Cellar under whole house.

All piers in basement, partitions on first floor, and main bearing partitions on upper floors to be of hollow cement blocks, plastered.

Floor joist 2-inch by 10-inch—16-inch o. c. Rafters 2-inch by 6-inch. Minor partitions to be of 2-inch by 4-inch studs lathed and plastered. All floors double, with hard pine upper floors. Trim to be cypress, stained. Sash of white pine, painted. All glass D. S. A. Hardware of good grade. Fireplace of selected hard-burned brick. Roofs shingled with red asbestos cement shingles. Balcony at second story, front bedroom to be of 1-16-inch flat steel, riveted and painted black.

ESTIMATE.

Excavation	$40.00
Concrete and cement work	890.00
Carpentry	355.00
Trim	450.00
Painting, etc.	80.00
Hardware	50.00
Tin Work	30.00
Wiring, etc.	60.00
Total cost	$1,955.00

Cubic contents, 15,086 cubic feet, including porches.

CLASS BI.—TWIN DWELLINGS, COST OF EACH NOT TO EXCEED $2,000.
FIRST PRIZE ($100). DESIGN NO. 177.

Interesting design, with well-broken surfaces relieving the monotony which usually results from the use of concrete blocks. Rooms well-lighted and airy. The dining-room could be easily transformed into a bedroom and the room squared by cutting the pantry in half. The bush-hammered blocks specified give a good texture, although somewhat expensive.

Of this design the successful author, Mr. Andrew Lindsay, of New Rochelle, N. Y., furnishes the following description:

THE foundation walls up to the level of water-table and the entrance steps will be of monolithic concrete cast in the usual manner in wood forms. The upper walls will be built of hollow concrete blocks with bush-hammered face. Special blocks to be cast to form paneling and projections.

The roof brackets will be concrete cast in wood moulds and soffit of roof projection will be plastered with cement on metal lath.

Chimneys will be built of hollow concrete blocks.

Main partitions throughout will be of 4-inch concrete blocks.

Minor partitions will be 2-inch by 4-inch spruce lathed.

Floor and roof beams will be 2-inch by 10-inch spruce.

The inside of exterior walls, concrete partitions and walls and ceilings which have been lathed will be given two coats of plaster floated to a rough sand-finish.

The exterior walls will be a light granite pink in tone and the projecting rafter ends and roof shingles will be stained silver gray.

The door and window frames and blinds will be painted silver gray.

ESTIMATE.

Excavation	$60.00
Concrete, plastering, etc	2,800.00
Wood work and mill work	875.00
Electric wiring or gas piping	50.00
Painting and glazing	90.00
Hardware	85.00
Total cost	$3,960.00

Cubic contents—33,600 cubic feet.

CLASS A2.—SINGLE DWELLINGS, COST NOT TO EXCEED $3,000.

FIRST PRIZE ($150). DESIGN NO. 91.

A concrete-block design of excellent plan and charming exterior, beautifully rendered with a suggestion of its surroundings. The use of a single chimney is to be commended and the termination of the main wall construction at the general level of the eaves. The surfaces are well broken, already mentioned as desirable where blocks are used.

Of this design the successful author, Mr. Albert G. Hopkins, of Boston, Mass., furnishes the following description:

THE estimate is based on the following specifications:

The outside walls and vestibule to be of 8-inch hollow concrete blocks, plain face and of light blue gray in color.

The blocks show in vestibule, 12-inch monolithic foundation.

Monolithic lintels (waterproofed) with two square rods in bottom of lintel to be used over all openings.

Granolithic porch floors, front and back door steps and living-room hearth marked off into 2-inch squares.

First and second floor walls and ceilings plastered rough floated. (Except the living-room and porch ceilings which show the 2-inch by 6-inch joists and girders.) Porch ceiling to be left rough sawed.

Outside finish (of cypress), blinds, doors and sash to be painted.

Inside finish of cypress, waxed, except kitchen, which is to be shellacked.

All floors, except kitchen, to be waxed. Kitchen floor is to be oiled.

Kitchen and bath-room walls to be painted (oil paint) on smooth plaster.

All other plaster walls throughout house to be tinted on rough-floated plaster.

Latches will be used on the outside doors and laundry yard gate.

The window frames set practically flush with the outside of wall, giving a plaster reveal on the inside. The window frame and wooden stool forms the inside finish for same.

All finish inside and outside to be plain—no mouldings.

Inside doors to be four panel, stock pattern.

N. C. hard pine floors throughout.

Laundry in basement.

Shingle roof.

ESTIMATE.

8-inch blocks	$412.00
12-inch monolithic foundation	237.22
Granolithic	209.83
Excavating and mason work (apart from above work)	200.00
Plastering	250.00
Painting, staining and tinting	200.00
Gutters, conductors and hardware	40.00
Finished hardware	40.00
Windows and frames and weights and doors	200.00
Carpenter material and labor	1,000.00
Electric wiring	35.00
Total cost	$2,844.05

Cubic contents—25,747 cubic feet.

CLASS B2.—TWIN DWELLINGS, COST NOT TO EXCEED $3,000 EACH.

FIRST PRIZE ($150). DESIGN NO. 178.

The floor arrangements are commodious, and the exterior pleasing from its simplicity and suggestive of the use of concrete. It is to be regretted that, although the specifications give the foundations to first floor level of concrete and the walls above of bush-hammered blocks, the author has not shown his texture, as it would have added to the interest of the surfaces.

Of this design the successful author, Mr. Andrew Lindsay, of New Rochelle, N. Y., furnishes the following description:

THE foundation walls up to the level of first floor beams, the entrance porches, verandas, balustrades and posts will be of monolithic concrete cast in the usual manner in wood forms. The upper walls will be built of hollow concrete blocks with a bush-hammered face.

The roof brackets will be concrete cast in wood moulds and soffit of roof protection will be plastered with cement on metal lath.

Chimneys will be built of hollow concrete blocks.

Main partitions throughout will be 4-inch hollow concrete blocks.

Minor partitions will be 2-inch by 4-inch spruce lathed.

Floor beams will be 2-inch by 10-inch spruce lathed. Roof beams 2-inch by 10-inch spruce.

All partitions and ceilings and inside of exterior walls will be plastered with two coats floated to a sand finish.

The exterior walls will be light gray in tone, the shingles of roof will be stained silver gray.

The door and window frames and blinds will be paintel apple green.

ESTIMATE.

Excavation	$70.00
Concrete construction, plastering, etc	3,950.00
Carpentry, mill work, etc	1,575.00
Electric wiring	80.00
Painting and glazing	115.00
Hardware	105.00
Total cost	$5,895.00

Cubic contents—61,000 cubic feet.

CLASS A3.—SINGLE DWELLINGS, COST NOT TO EXCEED $4,500.

FIRST PRIZE ($200). DESIGN NO. 96.

This is a remarkably compact plan, with severely simple outlines, well adapted to monolithic wall construction. A single chimney answers all requirements. The relations of the first story rooms to each other are not only practical, but well thought out in dimensions and variety of forms; which is equally true of the second story. The exterior appearance is most pleasing, and the drawings well rendered, the perspective sketch in pen-and-ink being unusually clever. The wall surfaces are specified to be finely picked, which gives an entirely satisfactory finish, especially when the aggregates are well chosen.

Of this design the successful author, Mr. W. Cornell Appleton, of Newton Center, Mass., furnishes the following description:

MONOLITHIC concrete walls. Surface fine picked; 4-inch by 8-inch by 16-inch hollow block partitions in first story.

Chimneys.—Concrete blocks with skim coat above roof.

Roof.—Variegated red slate laid in irregular courses.

ESTIMATE.

Excavating and concrete	$2,050.00
Lumber	430.00
Mill work	350.00
Carpenter work	600.00
Stairs	175.00
Hardware	150.00
Slating	200.00
Plastering	300.00
Painting and staining	100.00
Total cost	$4,355.00

A monolith wall with air space could be used for a sum slightly in excess of the above figure.

Cubic contents—37,052 cubic feet.

CLASS B3.—TWIN DWELLINGS, COST OF EACH NOT TO EXCEED $4,500.

FIRST PRIZE ($200). DESIGN NO. 156.

This design is excellent and individual in both plan and elevation, particularly in elevation. The wall surfaces lend themselves readily to monolithic construction, although plastering on concrete is open to criticism, as already pointed out, where exposed to the weather. The drawings are well drawn and rendered.

Of this design the successful author, Mr. Eugene Ward, Jr., of New York, furnishes the following description:

OUTER walls and porch posts to be of monolithic concrete construction. Cellar and porch floors to be of concrete. Outer walls to be eight inches thick, cemented on the outside and furred with wood furring strips and plastered on wood lath on the inside. Outside walls to have rough-cast finish, stained. Chimneys to be lined with flue tile. Cellar under whole house.

All piers in basement, partitions on first floor, and main bearing partitions on upper floors to be of hollow cement blocks, plastered.

Floor joists 2-inch by 10-inch, 16-inch O. C. Rafters 2-inch by 6-inch.

Minor partitions to be 2-inch by 4-inch studs lathed and plastered.

All floors double with hard pine upper floors. Trim to be cypress stained. Sash of white pine painted. All glass D. S. A. Hardware of good grade. Fireplaces of selected hard burned brick. Roofs shingled with red asbestos cement shingles. Balcony at second story front bedroom to be of 1-16-inch flat steel riveted and painted black.

ESTIMATE.

Excavation	$160.00
Concrete and cement work	4,050.00
Carpentry	2,000.00
Trim	1,800.00
Painting, etc.	350.00
Hardware	250.00
Tin work	125.00
Wiring, etc.	250.00
Total cost	$8,985.00

Cubic contents—35,000 cubic feet.

In submitting this report, we regret exceedingly that Mr. Gibson, the third member of the jury, had not been able to collaborate with us, owing to circumstances which prevented him from coming to Philadelphia.

(*Signed*) EDGAR V. SEELER.
SANFORD E THOMPSON.

May 22, 1907.

MR. JOHN B. LOBER, Chairman,
Executive Committee,
Land Title Bldg., Phila.

Dear Sir:—As chairman of the committee appointed by the association to procure plans and award prizes for designs for suburban dwellings in concrete, it gives me pleasure to hand you herewith the report of the judges appointed in accordance with the terms of the competition. This report, which was presented on May 20, is signed by Messrs. Edgar V. Seeler and Sanford E. Thompson, two of the three judges, which the committee selected. The third judge, Mr. Louis H. Gibson, of Indianapolis, was unfortunately prevented by reason of press of important business from acting in the judging of the plans, but left the matter in the hands of his two associates, as above stated. Following the receipt of the report of the judges, the secretary of the Association of American Portland Cement Manufacturers opened the sealed envelopes containing the names and addresses of the several competitors and the following gentlemen were found to be entitled to the prizes referred to in the report of the judges:

CLASS A1.

First Prize.—Eugene Ward, Jr., 11 East Twenty-fourth street, New York.

Second Prize.—David A. Clous, 1 West Thirty-fourth street, New York.

Third Prize.—L. B. Abbott, F. H. Bond, Jr., 122 Ames Bldg., Boston, Mass.

Honorable Mention.—Geo. S. Idell, 1117 Harrison Bldg., Philadelphia; James H. Van Booskirk, 923 Lumber Exchange, Minneapolis, Minn.

CLASS B1.

First Prize.—Andrew Lindsay, 64 Center Avenue, New Rochelle, N. Y.

Second Prize.—Geo. S. Idell, 1117 Harrison Bldg., Philadelphia.

Third Prize.—Grant M. Simon, Abram Baston, 1524 Chestnut Street, Philadelphia.

Honorable Mention.—George B. Eick, 175 Dearborn Street, Chicago, Ill.

CLASS A2.

First Prize.—Albert G. Hopkins, 15 Beacon Street, Boston, Mass.

Second Prize.—Frank H. Hutton, Arthur Francis Buyo, 63 William Street, New York.

Third Prize.—F. H. Bond, Jr., L. B. Abbott, Boston, Mass.

Honorable Mention.—Mellon & Meigs, 1420 Chestnut Street, Philadelphia.

CLASS B2.

First Prize.—Andrew Lindsay, 64 Center Avenue, New Rochelle, N. Y.

Second Prize.—L. B. Abbott, F. H. Bond, Jr., Boston, Mass.

Third Prize.—Lindley Johnson, Harrison Bldg., Philadelphia.

CLASS A3.

First Prize.—W. Cornell Appleton, Newton Center, Mass.

Second Prize.—Albert G. Hopkins, 15 Beacon Street, Boston, Mass.

Third Prize.—L. B. Abbott, F. H. Bond, Jr., Boston, Mass.

Honorable Mention.—J. Lovell Littell, Jr., 15 Beacon Street, Boston, Mass.; Albert C. Wiser, 146 West 111th Street, New York.

CLASS B3.

First Prize.—Eugene Ward, Jr., 11 East Twenty-fourth Street, New York.

Second Prize.—Benjamin Proctor, Jr., 8 Exchange Place, Boston, Mass.

Third Prize.—W. Cornell Appleton, Newton Center, Mass.

The competition was in every way carried on in accordance with the terms of the programme and it is a matter of congratulation to our association that the architects of the country took such a keen interest in the competition as evidenced by the number of plans received and the extreme beauty, artistic feeling and general good taste in the work presented.

The thanks of the committee are tendered to the judges for their valuable and painstaking consideration of the plans.

Respectfully submitted,
ROBERT W. LESLEY.
Chairman, Committee on Competitive Plans.

Cement-Testing

THE greatly increased use of concrete of late years both for fire-resisting floors and in reinforced construction, has brought the question of the testing of Portland cement into a prominence which it has hardly occupied hitherto in an architect's estimation. For ordinary building work he has been quite contented with the specification which satisfied the early users of the material, demanding nothing more than that the cement should be supplied by an approved manufacturer, should be of good color, and should not feel cold to the touch when the arm is plunged into it. Certainly further stipulations have been frequently introduced into the specifications, but it has been an exceedingly rare thing for an architect to apply any actual test at all. He has been accustomed, probably, to specify that the weight should not be less than 110 pounds per striked bushel, that it should stand a pull of at least 350 pounds per square inch before fracture when made into a briquette and immersed in water for seven days, and that there should be a residue of not more than five per cent. left on a sieve having 2,500 holes per square inch. Still, it has been a most rare thing indeed for an architect to either weigh his cement, sift it, or put a briquette in the testing machine. If he had done so within recent years he would have had no difficulty whatever in satisfying the requirements which he has specified, and he would have gone away feeling quite satisfied when possibly his cement was of an utterly inferior character, little thinking that the maker was laughing at him, and entirely ignorant that engineers were demanding a material of so much higher a character that it could hardly be considered to be the same thing at all. To begin with, the weight of cement depends so much upon the way in which it is packed into the measure that no standard is possible. Should the cement be a trifle light, it is easy to press it down, without appearing to do so, to an extent which is sufficient to raise the weight of what is contained in a bushel box up to the required 110 pounds. On the other hand, if the specific gravity be ascertained, this is a thing which it is impossible to manipulate. According to the specification of the Engineering Standards Committee, the specific gravity should not be less than 3.15 when sampled and hermetically sealed at the manufacturer's works, nor less than 3.10 if sampled after delivery. Roughly, this corresponds with the old weight test; but it is accurate and reliable, instead of the reverse. Then, in the matter of strength, it would

be difficult now to meet with a cement made by modern methods, and carefully ground in the modern way, which would not stand considerably more than 350 pounds per square inch after seven days' immersion in water. The Standard Specification requires 400 pounds per square inch at seven days from gauging, which means actually only six days after immersion, for the briquette, though removed from the mould as soon as it is sufficiently set for this to be done without injury, is kept in a damp atmosphere for the next twenty-four hours, and is only then put into water, in which it then remains for six days only before the tensile test is applied. The Standard Specification is extremely explicit with regard to this, requiring that the water in which the briquette is submerged shall be of a temperature which is maintained between fifty-eight degrees and sixty-four degrees Fahr., and that the load shall be gradually applied in the testing-machine, starting from zero and increasing at the rate of 100 pounds every twelve seconds.

Taken on the whole, this tensile test is not one which is of any extreme importance, as cement is rarely used in a state of tension. It has become recognized, and there the matter rests; but a very strong cement in this respect may, after all, be an entirely unsound one. Much more important is the test for fineness of grinding. It would now be thought that *any* particles held back by a sieve of 2,500 holes per square inch would be likely to cause destruction, because they would not take up water sufficiently soon and might subsequently do so, and expand in the process after the rest of the bulk had set. This point was hardly recognized in the old days, nor, in fact, was it then possible to grind to the extreme fineness which is now demanded. It is not only possible, but quite easy, for manufacturers to meet the requirements of the Standard Specification in this respect, which demands that there shall not be more than three per cent. residue on a mesh having 5,776 holes per square inch, made of 76 strands of wire in each direction to the lineal inch, the wire being .0044 inch in section—even the wire thus being standardized. Further than this, the residue left on a sieve having 180 strands in either direction per lineal inch, or 32,400 holes per square inch, is not permitted to exceed 22½ per cent., the wire used in this case being about half the thickness of that required for the larger mesh—namely, .002 in.

Even yet the necessary tests to which all cement must be subjected which is to be used in important work, such as reinforcement, are not exhausted. There must be no tendency, for instance, to undue expansion, either during setting or afterwards, and no likelihood of disruption through the cement being over-cooled or over- or under-burned. The old rough-and-ready test for coolness, of plunging in the hand or arm, is still a fairly satisfactory one, and, strange to say, no substitute for it is provided in the Standard Specification, unless it be the expansion test by the Le Chatelier method. This is an exceedingly delicate test, requiring that a small split cylinder, open at both ends, shall be filled with gauged cement, and then placed in water for twenty-four hours. The cylinder has a long index needle attached to it on each side of the split, so placed that the two needles are parallel. When the mould is taken out of the water, the distance between the extreme points of the needle is carefully measured. The mould is then plunged into cold water, which is brought to boiling point in a period ranging between fifteen and thirty minutes, and kept boiling for six hours. A thoroughly bad cement will in that time turn to soup, while a "cool" but otherwise sound cement will shrink to such an extent that it will drop out of the mould. On the other hand, a cement which is likely to expand in working or after setting will slightly open the split of the cylinder. This will be exaggerated by the long needles, so as to be measurable by comparing the distance between the points with that previously ascertained. This is such an easy test to apply that it is somewhat wonderful that it has not been adopted on building works of even moderate importance; but prejudice and custom are difficult things to overcome, and there is still an inclination on the part of a great many to trust to the simple old "bottle" test, which consisted in nothing more than filling a bottle with mixed cement, allowing it to set, and then, after a few days, noting whether the bottle had cracked, which would show expansion, or whether, if colored water were poured in, it would indicate by its presence between the cement and the glass that contraction had taken place. Certainly in the latter respect it is a sound test, and except that it requires more time for its development, as the action is not accelerated by the use of heat, it is as efficient as any other; but with regard to expansion it is well to remember that bottles are by no means of uniform strength, and that an expansion which will utterly destroy one of weak make will have no effect whatever on another of stronger manufacture. The advantage of the Le Chatelier test is that the amount of expansion can be accurately ascertained and a standard determined upon. This is not possible even with the ordinary boiling test, which, however, is otherwise a good one. At any rate, it will detect whether a cement is moderately sound or utterly worthless. It is performed by making a pat of cement about three inches in diameter and half an inch thick, tapering off to a feather edge, on a small sheet of glass, allowing this to set for six hours in air, and then placing it in a saucepan or kettle of cold water, which is brought to the boil and kept boiling for six hours. If the pat be made of sound cement it will emerge from the boiling water perfectly uncracked and adherent to the glass, while a bad cement will float away and utterly disintegrate long before the six hours are over.

Chemical analysis is generally out of the question in small building works; but it is an essential if the composition of the cement be in the least degree doubted. . . . Rough testing on the job by the clerk-of-the-works may serve the purpose temporarily and in many cases, but where high quality is essential it does not suffice. It is not to be expected that the most conscientious clerk-of-works, even if he be provided with the necessary apparatus, is an expert chemist or physicist, capable of making an accurate analysis of so complicated a product as Portland cement, or of determining the specific gravity of a fine powder which has the awkward property of setting into a hard mass when water is added to it.—*The Building News.*

COMMUNICATION

THE ORIGINATION OF THE STEEL SKELETON IDEA.

WASHINGTON, D. C., June 27, 1907.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—Your editorial in the issue of June 22 anent the Gilbert-Buffington-Jenney claims as to which should be considered the originator of the modern steel skeleton construction was most interesting to me and brought up a flood of old though not particularly pleasant memories.

The proceedings, evidence, etc., introduced before the American Institute of Architects must have been a sort of star-chamber affair, because this is the first I hear of it, and I generally manage to keep pretty well posted as to what is going on in architectural matters. Besides, what the mischief had the Institute to do in settling any such disputation that is so essentially purely legal in nature, and that is dreaded even by the highest and best equipped courts in the land?

I know that Colonel Jenney's Home Life Building in Chicago was the first skeleton structure in the country. I did not even know that Mr. Gilbert had claims to antedating it, but it never seemed to be that the Buffington, or any of the other, patents in that line of construction amounted to a row of pins. The whole thing was rather the result of sometimes slow, sometimes rapid, evolution and the fertility of the American mind to grapple with existent conditions.

The Buffington patent always seemed more or less of a joke to me. In 1883 I was employed by him as a designer. Previous to that time I had had a lot to do with high church towers and had often thought over some scheme or other of doing away with the excessive weight and thickness of their supporting walls. The steel skeleton did not present itself to me then as a full-grown flower, but rather in the shape of a seed deposited in not unfertile soil. My idea was to reinforce the walls with iron beams placed vertically. Well, in '83 Mr. Buffington had, as you may remember, the cream of the work of the West. The first thing I had to tackle was some trouble in the West Hotel, then under construction. One of the bay-windows had fallen down or something or other, and I "flashed" my beam-reinforcement, but was pooh-poohed for my pains. But a little while later the *Tribune* Building and several other big commercial structures were on the tapis. There the seed had taken root and was actually pushing up sprouts. I wanted to get the *Tribune* people into the notion of building a twelve-story structure and made the sketches showing cast-iron columns, bedded in a thin outer wall, with girders at each story, and the next story's thin outer wall carried on that line of girders, and so on up. This was termed "crazy construction" by Buffington. But at the time there was rather

a skilful engineer there (who also later invented the tubular tunnel that has been so much infringed in subsequent times) named Strom, who figured up this construction very carefully, proposed a substitution of wrought-iron members for the cast columns and declared that such a building could be carried up and safeguarded against wind, etc., easily to twenty or twenty-two stories. In 1886 I severed my connection with Mr. Buffington and was succeeded by probably the cleverest designer of his day, Harvey Ellis. Strom was still there. In due course of time there appeared in the *American Architect,* I believe, or in another technical publication, a splendid picture of a twenty-five story building "designed" by Buffington. People generally looked upon it as a wild-eyed scheme, and even I felt a bit ticklish about the twenty-five stories, but gave it no particular thought, treating it merely as a "project," but knew nothing of its being *patented.* Some years later I was surprised to see that suits had been filed by Mr. Buffington against several owners and architects in Chicago for infringing his "patent." Nothing came of these suits.

And that, in brief, is the history of at least the Minneapolis end of the steel skeleton construction's conception.

Very truly yours, F. W. Fitzpatrick.

ILLUSTRATIONS

FIRST-PRIZE DESIGNS IN THE COMPETITION OF THE ASSOCIATION OF AMERICAN PORTLAND CEMENT MANUFACTURERS FOR SUBURBAN CONCRETE DWELLINGS: FIVE PLATES.

For descriptions and criticisms, see elsewhere in this issue.

A COTTAGE AT EVANSTON, ILL. MESSRS. TALLMADGE & WATSON, ARCHITECTS, CHICAGO, ILL.

CONNECTICUT STATE LIBRARY, HARTFORD, CONN. MESSRS. EDWARD HAPGOOD, HARTFORD, CONN., AND DONN BARBER, NEW YORK, N. Y., ASSOCIATE ARCHITECTS: TWO PLATES.

Additional Illustrations in the International Edition.

HOUSE OF F. C. FARWELL, ESQ., LAKE FOREST, ILL. MR. ARTHUR HEUN, ARCHITECT, CHICAGO, ILL.: TWO PLATES.

HOUSE OF J. V. FARWELL, ESQ., LAKE FOREST, ILL. MR. ARTHUR HEUN, ARCHITECT, CHICAGO, ILL.: TWO PLATES.

NOTES AND CLIPPINGS

Water in Concrete.—The effect of water used in making concrete aroused an animated discussion among German concrete specialists in 1901, and to settle it about ninety-nine tons of test pieces were made up by various parties and sent to Prof. C. Bach, of Stuttgart, for test. This work lasted about four years, and the results have recently been published in the *Zeitschrift* of the Society of German Engineers. The records of the methods of preparing the test pieces and the amounts of water used in mixing the materials were forwarded with the samples. Tests of samples made by the same men under uniform conditions in Prof. Bach's laboratory showed that the smallest amount of water which produced a mixture suitable for ramming gave the strongest concrete, but the highest degree of skill and care was required. Larger amounts of water enabled less competent workmen to produce good concrete and in practical work are an insurance against the injurious effects of varying degrees of moisture in the sand and stone, changeable atmospheric conditions and other factors. These statements, it will be observed, are the same as those made by concrete specialists in the United States, and indicate the extreme care necessary in basing field methods on the results of laboratory experiments by trained workmen. The tests represented work done under a great variety of conditions, and the specimens were representative of good German practice.—*Engineering Record.*

Old Inn Names.—The "Goat and Compasses" is believed to be a corruption of the phrase "God en-compasses us," and "The Bag o' Nails," which was the title of one or two inns in England, is really "The Bacchanals."

A New Use for the Eiffel Tower.—The French Government has decided to use the Eiffel Tower as part of the army wireless telegraph system. Using it in the last army maneuvers, the War Department was able to maintain communication with the Eastern frontier along the Vosges, and since then the tower station has communicated with London and Berlin. New installations are being made for maintaining regular communication with Algeria and Tunis.—*Iron Age.*

Jique Wood Ties.—Mahogany is often used for ties by the railroads in Cuba as well as in other tropical countries, but Sir William Van Horne has forbidden it on his road. He considers it a crime to cut small mahogany trees, and there is plenty of other timber in the forests suitable for construction purposes. Jique (pronounced hickey), acana, jucaro negro, all hard woods which do not grow large and cannot be utilized for cabinet-work, are just as good as mahogany for ties and will outlast steel rails in this climate, because they won't rust. On the railroad between Nuevitas and Camaguey, the oldest in Cuba, which was built in 1838, are jique ties that have been in use for fifty years. Some of them have been taken out and used for fence posts after thirty years in the railroad bed. There is a tramway at Camaguey with rails of jique wood over which the cars have been running for more than a quarter of a century, and they do not show wear any more than steel after the same service. Much of the wood is so hard and heavy that it will sink in water. —*Chicago Record-Herald.*

New Parks on the Site of the Paris Fortifications.—In a comparison between London and Paris in respect to the extent of open spaces and public gardens in each city, M. Hénard, architect, demonstrated a year ago the inferiority of Paris, where, in consequence of the heavy taxes laid upon land not built upon, the private gardens tend more and more to disappear, while the public gardens are insufficient in number and extent for the requirements of the population. Taking for his text the question of the suppression of the fortifications, the eminent architect has returned to the charge on this subject, which is of such vital importance to public health. The utilization of the site of the fortifications is still far from being decided. The Municipal Council has demanded that the space should be left free. The State, on the other hand, wishes to retain possession of it and to draw a profit from disposing of it to trading firms, who will build factories where what is wanted is air, light, and trees. M. Hénard, in his recent publication, strongly insists on these latter requirements. His scheme, in its principal features, consists in creating around Paris four large parks, at Clignancourt, Bagnolet, Ivry, and Vaugirard, of which the superficies would vary from 9 to 30 hectares (a hectare is nearly 2½ English acres). He does not propose to exclude all building, but to leave large space for lawns, for trees, and for games. His programme is also very attractive from a decorative point of view. At Clignancourt he proposes to establish a park on English lines; at Bagnolet a park in French style, with a large terrace recalling that of St. Germain. The park at Ivry, which has an eastern aspect, will be suitable for Alpine plants, while that at Bagnolet, which is very well sheltered, will be suitable for the plants of warmer countries. It is hoped that the Municipal Council will give its support to M. Hénard's scheme, which will be both an embellishment and a source of health to the capital.—*The Builder.*

The Tale of Two Bells.—Two monster church bells, the "Bummerin" in Vienna and the "Savoyarde" in Paris have been the subjects of much discussion recently. "They are both silent bells," says a writer in a Hamburg paper, "but for different reasons." The Vienna bell, cast in 1711 from captured Turkish guns, hangs in the tower of St. Stephan's, and for many years its deep tones boomed from the belfry, calling people to prayer and to assemblages of joy and of sorrow. But the nerves of old St. Stephan's could not stand the heavy thundering, and the "Bummerin" was silenced. Now there is an agitation to build a suitable tower for the bell. The French silent bell was a gift from the people of Savoy for the Church of the Sacred Heart at Montmartre. Before the monster could be placed in a belfry it was discovered that in casting or transportation the bell had sustained a fracture, and that vandals had bored holes into the outer part and had filled them with lead, thus ruining the great bell's voice. Nothing remains to do but to recast the bell. This will take some time, and when it has been accomplished the firmament in religious France may have cleared to such an extent that the bell may be christened as Schiller's bell.—*Concordia.*

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THE onlooker does not have to be a believer in, a devotee to, the agreeable and convenient theory of *laissez aller* before he feels justified in regarding with a good deal of apprehension the possibly stupendous changes that are being wrought in our commercial affairs, with such merry inconsequence, by courts and legislatures. The difference between the beneficent and the maleficent trust is one the law can hardly determine, since the good or evil that has been done by these modern organisms seems to turn mainly on the moral nature of the men who control them and conduct their operations. The various anti-trust laws take no notice of this difference, one which is not only possible but actual, and simply rule that the trust is criminal, and those connected with it are beyond the pale. We have no desire to argue that anti-trust legislation is all wrong and that trusts are all right, but we do feel that, as the evils, so-called, that the public suffers at the hands of the trusts have been matters of a very slow and gradual growth, the commercial public has been able to adapt itself to them with no very serious difficulty; but that if the steps taken are to be retraced, not gradually and by degrees, but suddenly and all at once, it would seem certain that commercial paralysis must result, while the business world halts to study and understand, each man from his own selfish standpoint, the new conditions. Among the first to feel the effects of the new movement will be the building industries, in which billions of dollars are invested, for not only do building operations involve large expenditures and cover much time between inception and income, but they depend very largely on the condition of the money-market, and that, for some time past, has given indications that the wise will do well to consider and try to understand.

IT would seem as if unwisdom could go no farther than the State of Texas has gone in putting into execution, as it did last week, its new anti-trust law. This law provides that any person who, as agent, represents a trust or any tradesman who sells any article made by a trust or combination, shall be deemed guilty of a felony, and, upon trial and conviction, shall be imprisoned in the penitentiary for from two to ten years! And this law the Attorney-General announces he will enforce to the last letter. Honestly enforced, this law should easily be able to put instant stop to trade of all kinds in every town in the State, before even a single suit had been prepared for trial; for what man can be sure that he may not form the subject of the Grand Jury's first presentment? The operations of the trusts are so manifold, the distribution of their product is so immense, and the manner in which it is worked up into saleable articles is so complex that there can be no tradesman in the State who can look over his stock without finding that most of it derives from tainted sources. And even if his knowledge as to the source of origin is imperfect, he can only feel safe by closing his doors, lest some spy better informed than himself may, after completing a purchase, go to the Attorney-General and lay an information against him.

SOME may say that extreme legislation of this sort is to be looked for only in such a State as Texas, and that what is done away off there in the Southwest has little real bearing on the general business situation. But the same cannot be said of legislative action in the State of Ohio, which also has an anti-trust law, the Valentine law, with whose provisions we are not familiar; but the State courts have at length determined to enforce these provisions, and last week, in Toledo, Judge Morris, of the Common Pleas Court, sentenced to imprisonment in the common workhouse, for the term of six months, each of twenty-one members of the Lumber Dealers' Credit Association, nine members of the Brick Dealers' Association and two bridge-builders' agents! Unquestionably these men broke the law, since they pleaded guilty, but it is also probable that these men are of such habits and standing that a short term in the workhouse, even though it be allowed by the law, is in their cases, and for such misdoings, a "cruel and unusual punishment." We do not argue that the operations of trusts are not, at times, wrongful and injurious, or that laws framed for their undoing may not be properly enforced; but we do feel that if warfare of this violent and theatrical kind is to be undertaken, the body politic is bound to suffer as during any other form of war, and that among other sufferers are to be the building interests.

IN essentially the same category must be placed the order of Judge Young, in the Court of Common Pleas at Pittsburgh, last week, although in this case the Court inflicted fines and not imprisonment of the offending parties, who were adjudged to be in contempt for having failed to obey its earlier order. In this case the ten thousand men employed by the Jones & Laughlin Company are threatened with loss of employment and wages because their employers have not been able to discover and install an apparatus whose use will enable the prevention of the ejection of dust from the blast-furnaces which has long inflicted a serious nuisance on the residents of the town of Oakland, where the works are situated. Here, too, the law, or the Court's order, has been broken and punishment was legally permissive; but the welfare of ten thousand workmen and their families was involved, and it would seem a debatable question whether theirs was not the preponderating interest.

THE latest reinforced-concrete accident, the falling of a four-story warehouse on Washington Street, Philadelphia, last week, which caused the death of two workmen and the injury of fifteen others, is one of an unusually revealing kind. In a general way, the accident had no uncommon features; so far as design, method and material are concerned, there seems to be reason for suspecting that work fell somewhat below the best standard, while still being good enough to furnish a reasonably safe building, once it had actually been completed. There was nothing novel, either, in the actual cause of the collapse, for the evidence seems to show that it was caused simply by the too early removal of the supports of a still green girder in the upper story. But the evidence shows clearly that the mishap was not a matter of construction but of linguistics. The workmen employed, the "cheap labor" held by many users of concrete to be so indispensable, were Italians, men imperfectly acquainted with the English language, and it is not surprising to learn that, when some of these men were told by the foreman to remove each alternate support of the girder that failed, they should have understood his words or his gesture to mean that all of the supports were to be removed. The idea once suggested, it is possible to conceive that the bitter growth of building fatalities, railroad accidents and mill disasters during recent years is directly due to our polyglot proletariat, and the rashness with which we are attempting to assimilate the peasantry of many nations, between whom and ourselves intercommunication through the English language must long be attended with doubtful consequences. A none too intelligent foreman, working through a very indifferently informed interpreter upon the slow intelligences of a gang of Italian or Hungarian workmen, would seem to promise the potentiality of disasters of every conceivable kind.

IT looks very much as if the thesis that a failure to carry out, to the letter, the conditions stated in a published invitation to architects to furnish competitive designs for a building is a breach of contract—a thesis Messrs. Rankin, Kellogg & Crane undertook to establish in their suit against the city of Newark, N. J., but found it desirable to abandon in favor of a settlement out of court—might be satisfactorily established by the suit that Messrs. Palmer & Hornbostel, *et al*, have brought against the Central Board of Education of the City of Pittsburgh, Pa., in the matter of the current High-school Building scandal, to which we have already referred. The present litigants do not contend that the Board erred in not awarding the execution of the building to Messrs. Rutan & Russell, who gained the first prize in the original competition, but they do maintain that, if there was lawful reason for withholding the contract from the successful competitors, the conditions of the published invitation constrained the Board to award the work to some other of the competitors who had fulfilled the requirements, and inferentially to the authors of the design placed second. The plaintiffs easily secured a temporary restraining injunction against awarding the work to Mr. F. J. Osterling, whose design submitted in the second competition was favored by a large part of the Board, and this injunction has now been made binding by Judge Swearingen until the question has been dealt with by a higher court. In making his decision, Judge Swearingen announces an interesting principle that it is well to keep in mind. The defendants set up the plea that relief, if any were proper, should have been sought at law and not through a suit in equity, but the court holds that action has been properly taken since the plaintiffs could have no remedy at law, while it was quite possible that the Supreme Court might rule in favor of a suit brought before a court in equity.

MOST things are about as broad as they are wide. The railroad managers who once were delighted when President Cleveland declared that the strikers would not be allowed to interfere with the carriage of the mails, are now squirming very uncomfortably when President Roosevelt talks of operating those same railroads as "post roads." In the same way the appraisers' ruling, which to-day is just the thing the importer desires, may be found by the same man to-morrow a most obnoxious and vexatious matter, particularly if he be an importer of works of art and artistry. The question what constitutes a "work of art" came up in an English court the other day in a curious form. A railway company sued to recover the excess freight rate it had charged, and desired to collect, for the transportation of a certain tombstone which consisted of a "monumental figure with a cross and base," asserting that the railroad was not a common carrier of statuary, and that such merchandise was always transported at special rates. The shipper contended that a statue "meant a work of art," while a tombstone should be defined as "a commercial figure." Those who are familiar with the aspect of the nearest cemetery will feel that the judge was quite right in adopting the shipper's point of view. But it is easy to imagine the chagrin of the excellent purveyor of mortuary memorials the next time he presents a bill to a client for a monumental figure, charged for as a work of art, when he finds his customer quoting Judge Bacon's decision that it can be only a commercial figure, and so worth a smaller sum.

Italian Cities—XVIII

Siena—I

SIENA is built on three hills, of medium height, which divide it into three quarters, or, more exactly, into three *"terzi."* Its origin and the date of its founding are lost in the mists of antiquity. The Etruscans lived there once, and we have the proof of it in the scattered Etruscan tombs that were discovered there during the last century, but no other trace of their passage, no other relic of their civilization has been found. In course of time it became a Roman colony; but, aside from certain inscriptions and a few bits of walling, Roman domination also left few things as souvenirs.

Converted to Christianity only in the fourth century of our era, the city in the course of centuries was distinguished for its piety. Over one of the gateways of the city can be seen the inscription:

COR MAGIS TIBI SENA PANDIT.

It was consecrated to the Virgin, at once its rampart and safeguard, and in moments of distress all the inhabitants might be seen following the dignitaries of the place in solemn procession to offer the keys of the city to the image of Mary in the Cathedral. Next to the Virgin, the saint most greatly revered was Saint Catherine. Sprung from the industrious people of Fonte Branda, she represents the religious activity of the fourteenth century. Her search for unknown forms of penitence, her austerity, her marvellous qualities of imagination excited in her contemporaries a very stupor of admiration. Her canonization by Pius II only consecrated the popular fervor, while the episodes of her career inspired many paintings.

Siena could not escape the Lombard yoke and for some time was ruled by counts of Frankish race. But in the eleventh century the Emperor Henry III conceded to the Bishops of Siena privileges so extensive that the latter's power found itself so magnified that it was soon able to eliminate that of the counts; later, priests and consuls conducted the affairs of the city. But this did not last long, the unquiet and quarrelsome spirit of the people soon withdrew them from the ecclesiastical jurisdiction. They rallied frankly to the standard of Barbarosa in his quarrel with the Pope, and Siena became one of the strongholds of the Ghibelin party, in spite of the excommunications fulminated by the bishops. From the twelfth to the fifteenth century the history of the city covers a struggle between the people and the nobles. At the outset the aristocracy had the upper hand in the government; but the introduction into the municipal organism of the foreign *"potestà"* and the Council of the Twenty-four seems like a popular victory.

In the thirteenth century the hostility between Florence and Siena reached an acute stage. The bloody battle of Montaperto, in 1260, was a victory for the Sienese. Ten years later, Charles of Anjou seized the city and made it enter the confederation of Guelfic cities of Tuscany. The constitution was modified, and the merchants succeeded at last in gaining the ascendency over the other classes and named a Council of Nine and a Captain of the People, through whom they carried on the government. Under their able management the city flourished. They embellished it as much as they could and favored the arts. They had voyaged much, had ransacked the world, because of the nature of their occupations they had knowledge of other civilizations—English, Flemish, French. Like good, practical, middle-class citizens they labored most to maintain peace and the prosperity of the Republic, and to this end they entered into alliances with their neighbors, and especially with the Florentines. Thanks to this state of relative calm commerce was able to take on a considerable development, the population increased in numbers in like proportion—it exceeded one hundred thousand souls—and works were carried out that immortalize this happy epoch. The Palazzo Pubblico was built and decorated, the Mangia tower lifted aloft its slender elegance, and the Cathedral was enlarged.

In 1355 Charles of Luxembourg passed through the city on his way to be crowned at Rome and the city did homage to him. But the too great servility of The Nine offended the national sentiment; a revolt broke out, with the approbation of the suzerain and The Nine were replaced by "The Twelve," who endured only thirteen years, when they gave way to "The Thirteen." It would take too much time to follow all the changes and alternations of success and failure of the two contesting parties that confronted one another; the division and the subdivision of their forces was favored by the *"contrade"* of the city, which, each, had its separate ensign, its banner, its church, its patron saint, its protector, and even its traditions.

At the close of the fourteenth century anarchy was at its height. The three personages of the greatest mark during the last two centuries of Siena's grandeur are, from the historical point of view, Saint Bernadino, who by his preaching introduced some little calm into these troubled souls; Æneas Sylvius Piccolomini, who was Pope under the name of Pius II and who counts at the same time as a cultivated man of letters, a soldier, a diplomat and a prelate—a pontiff of an extremely significant and sympathetic type; and finally there was Pandolfo Petrucci, surnamed "Il Magnifico," who during some years was the dictator of the city. Cruel, but able, he succeeded in governing the turbulent populace and had his will of them by all sorts of means, and in so doing he excited the admiration of Machiavelli. He reestablished order, for which he must be applauded, and allowed the pacific citizens to experience just then a term of prosperity analogous to that which their forefathers had enjoyed two hundred years before. At his death his sons did not understand how to maintain their power, and Siena placed itself under the protection of Charles V, who, soon getting discouraged in the attempt to reconcile irreconcilable adversaries, with hands always at one another's throats, ended by sending a small force to take possession of the city, under the command of Don Diego Hurtado de Mendoza, the most pitiless of the military leaders of those days. The soldiers took possession of the several quarters, and Don Diego, now become governor, began the construction of a fortress on the hill of San Prospero, just where nowadays is found the promenade of the Lizza. In despair, the Sienese implored the aid of the French, and in 1552, after a three-day battle, the Spaniards were driven out and the fortress razed. A small French garrison replaced the Spanish. In 1555, however, notwithstanding an heroic defense under the leadership of Marshal Blaise de Montluc, the city definitively fell into the hands of Cosimo de' Medici. The Spaniards and Florentines carried on the work of massacre as long as their strength lasted and only stopped when actually outworn. Siena never rallied from this blow; but, united to the Duchy of Tuscany, she henceforward followed its destinies. Victim of her own individuality and the dissension of her citizens, she, to quote the words of Charles V himself, lost her liberty because she had made ill use of it.

From the thirteenth century up to the sixteenth, within the closed girdle of Siena, there arose and flourished with uninterrupted progressiveness a school of painting entirely religious in character and uniform in style. From Duccio di Buoninsegna to Matteo di Giovanni there are to be found on the canvases the same figures of saints, both male and female, posed always in the same attitudes. And yet this uniformity of subject, which is in no way tinctured by any foreign influence, presents between one painting and another considerable differences. The awkwardness of the primitive poses, the rigidity of the draperies, the gross homeliness of the countenances, the formless hands and feet become supple, soften and grow refined, until at length we have the Madonnas of Matteo di Giovanni on their sumptuous golden backgrounds.

Protection in art ruled in Siena. The code of the painters in the year 1355 decreed that every foreign-born painter who wished to practise his art must pay a gold florin and give a guaranty of *L.* 25. Any one who broke this law was subject to a fine of forty crowns. Thanks to these regulations and because of the lack of sympathy for foreigners, a Sienese school was gradually developed that was absolutely distinct from all other Italian schools. For a long time a discussion has been going on as to whether the famous Madonna of Guido da Siena antedates the work of Cimabue, the grand Florentine painter; now the date was read 1221 and again it was read 1281. The question at length seems settled and the latter date is generally accepted. However that may be, it is with Duccio di Buoninsegna, at the end of the

thirteenth century, that Sienese art consciously asserts its force. His compatriots admire him jealously, and one of his paintings, a Virgin and Child, the one mentioned above, was, when finished, like the celebrated painting by Cimabue at Florence, borne in solemn procession through the streets to the Cathedral. Although one can still feel in his manner a Byzantine influence, he already has a well developed technique, and the strange character of his paintings derives rather from a sort of preconceived hieraticism than from an inability to draw rationally. Ambrogio and Pietro Lorenzetti added a new note. They did not content themselves with simple *tavole* for their sacred subjects; they aspired to fresco and, in fact, produced remarkable examples of historic, civic and moral paintings. Thus, Ambrogio Lorenzetti decorated one of the halls of the Palazzo Pubblico, and to-day, though time has greatly injured the work, one, beholding this ceiling, cannot but be struck with the boldness of his conceptions. The poetic allegories of the artist represent Justice, Concord and Peace, the virtues, that is, of Good Government in opposition to Bad Government which, with its disastrous effects, is shown adjacent. The primitive conception of these frescos is derived direct from Aristotle, who just at this time was beginning to be held in great esteem. They were executed between 1337 and 1339, but a century later they had to be restored, so greatly had they deteriorated.

Simone Martini, noted for his friendship with Petrarch—in fact, he painted a portrait of Laura, the poet's Platonic love—and his pupil and kinsman, Lippo Memmi, wrought into their paintings a new softness, a mysterious charm. Amongst their successors must be mentioned Bartolo di Maestro Fredi, Andrea Vanni and Sano di Pietro, who, in triptychs and other sacred compositions, developed the indications afforded by their elders. With Matteo di Giovanni we reach the highest perfection of this narrow but sumptuous art; his Madonnas, scattered through the churches, seem to exhale the most celestial purity.

Yet, about the year 1500, in spite of closed gates and defensive walls, new ideas and ways of artistic expression penetrated into Siena. The attempt to present nature naturally transformed concept and work alike. At this time da Vinci was triumphant and Perugino was erecting his crucifixions in the midst of peaceful fields; Raphael was working in the library of the Cathedral side by side with Pinturicchio and Giovanni Antonio Bazzi, styled "Il Sodoma," was refining his voluptuous charms. If the latter was not a Sienese, for he was born at Vercelli, in Piedmont, it is at Siena that one can best admire the diversity of his product, and if the influence of Leonardo da Vinci is perceived in his work, yet his own personality transforms it; so his work is quite personal and of singular beauty.

Under this sudden impulse, before the compulsion of this tempestuous wave from without, the Sienese school, with an impetuous bound, abandoned the hieratic art it had practised for years and adopted the forms of nature. Giacomo Pacchiarotti, Girolamo del Pacchia and Domenico Beccafumi were the great forces in this movement. Son of peasants, Domenico di Pace, surnamed Beccafumi, after his patron, is the most significant artist of the Sienese Renaissance. Twice only during his lifetime did he go forth from his beloved city; the first time during his youth, when he went to Rome to study the works of Michael Angelo, the second when he went to Genoa to decorate the palace of Prince Doria, at that potentate's solicitation. Painter, engraver, mosaicist and sculptor, he enriched the city of his predilection with many chefs-d'œuvres, frescos in the Palazzo Pubblico, many paintings, and especially and to his redounding glory the later portions of the mosaic pavement of the Cathedral of Siena. His life is summed up by one of his biographers in these words: "He loved his country, his native city, his art and God."

The pupils of Beccafumi and Sodoma were, for the greater part, able workmen enough, but not great artists. It can be affirmed, then, that as soon as to the religious idealization of austerity and asceticism were joined the idealizations of a revived paganism, Sienese painting, after a last display of brilliancy, smouldered away and disappeared.

HONORÉ MEREU.

(To be continued.)

The Competition "Ghost"

THE architect's "ghost" has so frequently made his appearance amongst those concerned with architectural competitions, and with material advantages to those who may have called hi mforth, that some particulars respecting him may be of interest.

Although, as a rule, the architect who employs "ghosts" is perhaps more despised than the employed, yet, to the writer's personal knowledge, many of the most esteemed leading architects have had resort to such aids when preparing their competitive or other schemes for buildings out of their usual class of practice: such as municipal-offices, police-stations, hospitals, workhouses, asylums, public baths, theatres and music-halls; designs for which may have been required from an architect whose experience has been in other directions.

But cases have occurred where architects fully experienced in certain classes of design and planning have been anxious to obtain the ideas of other specialists, but without disclosing the names of those supplying the same; in some instances the aid may be required by reason of pressure of business.

The "ghost," however, has very frequently been employed by the county, municipal, district or other surveyor, who may have been charged with the duty of preparing designs for public buildings without possessing a sufficient knowledge of the nature of the work required, and who may thus deprive qualified architects residing within his district (ratepayers contributing to his salary) of business to which they may have some claim. (This work, supplied by a public surveyor, but done by the "ghost," becomes a reason for an increase in the official's stipend, to which, of course, the neglected architects contribute also their proportion as ratepayers.)

In the case of competitions, the remuneration of the "ghost" often takes the form of a salary to be agreed upon, together with a bonus in the event of success; or if the competitor be placed first, the first premium may be given, after which the "ghost" has no further claim, neither does he obtain any published credit in respect of his successful efforts.

Occasionally the whole of the work of the "ghost" may be done at his own residence or offices; such was the case in connection with an enormous public building, in reference to which the following agreement was signed by a certain very eminent firm of architects and a specialist employed by them:

MEMORANDUM OF AGREEMENT made this .... day of ...., between .... of the one part and .... of the other part. The said .... doth hereby agree to prepare the whole of the plans and drawings required and in accordance with the published instructions to architects, for the competition for the new .... at ...., and undertakes to deliver the same at least one week before the .... day of .... next, or at least one week before any later day that may be arranged for by the promoters of this competition; together with a full draft report and estimate of the cost, and will perform the work to the best of his ability and in accordance with all the requirements as far as may be possible. And the said .... do hereby agree to pay to the said .... in respect of the above services the sum of one hundred pounds in manner following, that is to say, the sum of ten pounds on the commencement of the work, the sum of forty pounds when the sketch plans are delivered, and the balance of fifty pounds when the finished plans are delivered, ready for mounting, etc., by the said ....

Should the said .... be appointed architects to carry out the works herein referred to, or any considerable part thereof, they agree to pay the said .... the further sum of two hundred pounds upon receiving the first installment of commission.

Signed by the said parties hereto, the day and year first above written. ....
....

The employers in the above agreement stood to obtain a commission which, at 5 per cent., would amount to £10,000, while the "ghost," in the most favorable circumstances, would not get more than £300, although he practically did all that was necessary in obtaining the work.

In what manner does the "ghost" obtain his employment? In some cases he notes that there is to be a competition of architects for schemes for some public building, the special details of which are familiar to him, and he forthwith writes a private letter to those local and other architects who may appear likely to enter upon a little speculation, offering his services upon "speculative terms," though not usually stating what those terms may

be in the first instance; occasionally, however, demands for such assistance are the later results of replies to advertisements in the professional journals.

An architect, now deceased, kept in his London office a couple of young assistants who inked-in, colored and finished a large number of competitive drawings which were supplied and finished ready in pencil by a "ghost," who also prepared the report and estimates; the architect who employed him was a thoroughly competent man for architectural work of certain descriptions, but found it necessary to employ someone to make the design for buildings, the details of which were not familiar to him; but it is only fair to state that he paid the "ghost" very handsomely for schemes that would have cost, probably, not less than £800,000 to carry out.

Occasionally a thoroughly incompetent architect is desirous of winning a competition, and has paid a specialist to come into his offices for the purpose. A case occurred some years ago of such a man whose only part in the work was the mounting of the plans on the stretchers; he was the architect of a set of chambers, and the only tenant of the building, which was a standing warning to his fellow townsmen *not* to employ him; but he won the competition by the efforts of the specialist he had selected! Thus some have greatness thrust upon them!

On occasions the "ghost" has supplied designs for more than one architect in the same competition, in this way gaining an increased possibility of obtaining a bonus, in addition to the extra salary, but this would not frequently occur, and the strain upon the "ghost" in making two schemes for the same building, within a limited space of time, would be considerable, especially where it was desirable that the two designs should be unlike in all respects.

The "ghost" may be perhaps an architect with a small practice who is a good draughtsman and designer, and it often happens that his services are valued rather in respect of the planning, arrangements and construction of a building than for the elevational portions, but his aid in reference to the report and estimates are often desired, especially in those cases where complicated questions arise as to the warming, ventilation, sanitation, engineering, artificial lighting, etc., of a very extensive series of buildings connected with a workhouse, asylum, hospital or other establishment intended for the housing of large numbers of various classes of inmates.

Or the "ghost" may be an architect's assistant out of employment who cannot afford the risk and expenses connected with a competition, but who is only too glad of the temporary work, especially when there is a prospect of further remuneration or employment in the event of success.

During recent years many architectural competitions have had, amongst their conditions, a clause prohibiting the employment of any assistant not a member of the competitor's ordinary staff, but unless a stipulation be added to the effect that all assistants employed must have been in such employment for a term named, the clause could easily be evaded; nevertheless, special assistance is often fairly required, for many details in connection with exceptional building plans, and particularly in reference to certain engineering and sanitary arrangements, are out of the range of an ordinary architect's practice; heating and ventilation and laundry appliances, as connected with very large buildings, have so frequently been unsatisfactory when contrived by architects not having the required previous experience of such works, that the employment of persons well acquainted with these subjects becomes obviously necessary and desirable.

Long before a competition was advertised, local influence has frequently settled that a local architect should have the commission, all that has been necessary being a scheme that would pass muster; hence the appointment of a "ghost" assistant. The selection of his design, however, has not been the only advantage to the architect. The writer recollects a certain case where a competing architect, not getting back his unsuccessful designs, called at the offices of the local surveyor, where, and to his very great astonishment, he saw his plans under the process of being traced; he acted very promptly by tearing off the tracings and, rolling up his drawings, departed, after expressing his opinions very freely.

In such instances as the above there have been deliberate attempts to steal the designs made by an architect, who may, for local reasons alone, have been unsuccessful; yet, as the designs of all the competitors are exposed to view, the unsuccessful architects may all be utilized as unpaid "ghosts"; in fact, there have been numerous instances where unselected designs have influenced very considerably the planning and appearance of the buildings as erected.

In spite of all that has been done towards putting down the "ghost" system, the Royal Institute of British Architects would be surprised to know the names of some of the Fellows and Associates who have taken either the part of "ghosts" or acted as employers of them, the latter including some of the most respected and best architects of the past quarter of a century.

A very well known firm of architects, in Lancashire, employed occasionally a very able architect as their "ghost": although he was very steady and reliable, yet it was found necessary (with his consent) to lock him up in an office while he was working, with only the plans and papers relating to the work in hand accessible to him, as he had a bad habit of turning to other subjects, and a great difficulty in concentrating his attention; probably had it not been for this failing he would have been in more successful practice on his own account; several works on construction were written and published by him and are of high value, but his habits and nature fitted him only for employment under architects with business habits; he gained some notable successes as a "ghost" in the employment of those who had the advantage of recognizing his great ability.—*"X" in the Builders' Journal.*

Standard Fire-resisting Construction[1]—I

THIS title opens up a very wide field, but I do not propose to attempt now to treat such a subject exhaustively, but rather to confine myself to certain points to which I wish specially to draw attention.

It has been very aptly stated that resistance to fire—and, in fact, resistance to aggression of any kind—may either be of the nature of a passive resistance or of the nature of an active resistance. In case of fire the term "active resistance" may be defined to mean sprinklers, and private and public fire-extinction appliances. The term "passive resistance" may be defined to mean a form of building construction which is not only in itself incombustible, but which also is least affected by heat or violent fluctuations of temperature, and, further, which is combined in design with a knowledge of the fire hazard, resulting from the occupancy of the building and from its exposure to surrounding hazards.

The most important of these two forms of resistance is undoubtedly the latter, because if in the design of a building a fire-resisting form of construction is adopted, and the risk of fire resulting from the occupancy and from exposure is foreseen and met beforehand to the greatest extent possible, then the danger of a fire making headway is reduced to the minimum, and the task of extinction is rendered comparatively easy. The extinction of fire, therefore, takes a secondary place, or should take a secondary place to fire-resisting construction and design made with a view (1) to lessen the hazard of an outbreak of fire, and (2) to limit the area of a fire when once it has broken out. The importance of this is in proportion to the severity of the risk resulting from the occupancy or from the exposure hazard; that is to say, the greater the fire risk the more need there is for fire-resisting construction and for appreciation of the hazard so that this may be met in the constructional design.

In saying this I do not wish to undervalue the function and importance of public and private fire-extinction appliances. These appliances are always necessary, but they are devoted to the extinction of fire, whereas fire-resisting construction and design are devoted to the prevention and limitation of fire.

I may add that, notwithstanding the highly efficient fire-brigades of the present day which exist throughout Great Britain, the annual fire waste in this country is enormous, and no doubt much of this is built up from losses on heavy risks which, by reason of their construction, are generally doomed to total de-

[1] A paper by Mr. F. A. Macdonald, read before the Edinburgh Insurance Institute.

struction from the outset of a fire, despite the exertions of the most efficient brigades.

In giving consideration to a form of construction and design which shall be as far as possible "fire-resisting," there are factors other than the actual combustibility of the structural materials which call for attention. Such factors are (1) diminution of strength of certain materials at increased temperatures, (2) efforts of expansion and contraction, and (3) resistance to disintegration under the application of heat and water.

These factors and others have been recognized by the Fire Offices Committee, which body has drawn up a set of rules bearing on the subject. These rules, I take it, are meant to serve as a guide not only to the insurance manager and surveyor, but also to the person to whom the design and execution of the fire-resisting structures may be entrusted. These rules lay down certain regulations as to height, cubical capacity, thickness of walls, superficial area of openings in walls, position of windows, construction of floors and roofs, protection of structural metalwork, floor openings and communicating compartments.

Generally speaking, I think that all buildings may be separated into four classes, as follows:

1. Combustible buildings which are of ordinary stone or brick construction, with wood floors and wood and slate roofs, and which make no pretension of being fireproof.

2. "Slow-burning" buildings having floors and beams of very heavy wood construction. This class may be passed over with bare mention, as such buildings are not to be commended on account of the very heavy smoke damage which always results, and also because they are rarely met with, and are likely to remain so on account of the rapidly increasing cost of timber.

3. Buildings constructed with incombustible materials but in which the structural metalwork is partly exposed. Such buildings are frequently met with. They are in no sense "fire-resisting," and form a class in reality more dangerous than either No. 1 or No. 2.

4. Fire-resisting buildings constructed in accordance with the rules of the Fire Offices' Committee.

It is, therefore, only with Class 4 that I have to deal, a class in which practically all combustible structural materials are prohibited, and only incombustible structural materials allowed to be used, all such materials as are largely influenced by heat being protected and insulated.

As is well known, steel and iron are materials which are practically indispensable for the construction of a modern warehouse or factory designed to be fireproof. Internal iron or steel columns or stanchions are almost invariably used to support the floor areas, and the floors themselves, whether fireproof or not, are carried between the columns by steel joists or girders. The influence of temperature on iron or steel is very marked. At high temperatures, these materials tend to become plastic and then molten. In other words, they lose their power of resistance to loads, and if not in some way protected or insulated from the influence of heat their ultimate collapse at high temperatures is certain.

Some actual data as to the influence of temperature on these materials may be of interest. The following table was compiled by Kollman, the resistance at 0 degrees C. (32 deg. F.) being taken as equal to 100:

Temperature Fahr.	Wrought Iron.	Steel (Bessemer).
32	100	100
212	100	100
392	95	100
572	90	94
932	38 plastic	34
1,293	16	18
1,652	6	9
1,832	4	7

The melting points given by Le Chatelier are:

For cast iron	2,228	degs. Fahr.
For soft steel	2,686	"
For hard steel	2,570	"

The highest temperature obtained in a blast furnace is 3,506 degrees Fahr. In the process of manufacture of steel the temperature attained when the steel is in a molten state is 3,000 degrees Fahr. in the Bessemer process, and 2,882 Fahr. degrees in the Siemens-Martin process.

With these figures before us, and keeping in view that the temperature in the heart of a building on fire may attain to 2,000 degrees Fahr., the absolute necessity of fully and adequately protecting all structural iron or steelwork will be readily admitted.

The rules of the Fire Offices' Committee provided for this by stating that all structural metalwork shall be encased with brickwork or with porous terra-cotta, or with cement, concrete or plaster, in thickness varying from one to two inches.

Probably no better material can be found for resistance to fire than good well-burnt brick, but to encase a column in solid brickwork has the disadvantage that the resulting pier takes up a great deal of valuable internal space. The proper protection of joists or girders with bricks is, for obvious reasons, cumbersome and difficult, and for the protection of these members porous terra-cotta or hollow tiles are sometimes used.

I would deprecate, however, the use of porous terra-cotta or slabs of concrete moulded beforehand, by means of which the soffits of the beams are protected. These slabs are generally attached to the under flange of the beam by a terra-cotta slab notched onto the flange, or, in the case of concrete slabs moulded beforehand, by having a strip of metal embedded in the concrete, which is turned over the lower flange. Such form of protection is not monolithic and solid with the main metallic member and when subject to violent heat, and the subsequent application of a strong jet of water from a fire hose pipe, these slabs are liable to fall off, leaving exposed the soffit surface of the joist or girder.

At the conflagration at Baltimore and at San Francisco, I understand that this took place to a considerable extent in buildings where such a form of construction was used.

The rules of the Fire Offices' Committee state that the porous terra-cotta must be "securely anchored" to the metalwork, but no definition of this term is given, thus leaving the design of the anchorage to each individual designer, with no doubt widely varying results. The other method of insulation permitted by the rules, namely, protection with cement concrete or cement plaster, is probably the most practical method, and the one most commonly used.

When placing in close contact with each other two substances for the purpose of protecting one of these substances by means of the insulation afforded by the other against violent fluctuations of temperature, it is important that the two substances should have relatively the same coefficient of expansion and contraction under varying temperatures. Concrete and steel are two substances which, although widely dissimilar in character, have, curiously enough, almost the same coefficient of expansion and contraction under varying temperatures. To be exact, this coefficient is identical for these two substances up to the fifth decimal place. For this reason it is possible to place these two substances in close contact with each other without the danger of stresses being set up by unequal expansion or contraction, and causing disassociation. There can be no doubt that this is an exceedingly important consideration, and it points to concrete as being a highly suitable material for insulating or protecting steel from fluctuations of temperature. Further, concrete has a large calorific capacity, or, in other words, it is a good non-conductor of heat.

In utilizing concrete as a fire-resisting material attention should be given to the aggregate employed in making the concrete. Certain aggregates seem to resist the action of fire better than others, but this should not be the only standpoint from which this important question is viewed, because many aggregates which offer a good resistance to the action of fire may be deleterious to the permanency and durability of structural steelwork when placed in permanent contact with it.

The aggregates for concrete given in the order of their reresistance to the action of fire seem to be as follows:

Coke breeze (i.e., the clinker of coke).
Burnt ballast.
Furnace slag.
Broken brick.
Furnace clinker.
Ballast.
Broken granite.

The tests of the British Fire Prevention Committee seem to point to the use of burnt ballast, furnace slag or furnace clinker as being the best aggregates for resistance to fire. This may be the case, but the use of these aggregates presents this very serious drawback—that such materials may contain in their chemical composition a proportion of sulphur, and the presence of sulphur is unfortunately apt to set up corrosion of the embedded steelwork. In view of this it is, I think, unfortunate that the Fire Offices' Committee should recognize the use of such aggregates, because in an indirect way this tends to encourage the use of what may be a very dangerous material from a constructional point of view. Such material being cheaper than natural gravel or pure broken stone will, in view of such recognition, be used unhesitatingly by many people, without any con-

sideration as to the chemical composition of the aggregate and its ultimate effect on steel.

In this connection I read recently, in a report of a special committee of the structural associations of San Francisco, that cases of corrosion of steelwork where concrete made with such aggregates had been placed in permanent contact with it had actually been found. The age of the floors which were broken up, and in which this was found, varied from four to ten years. In the report alluded to it was stated that sulphur, as sulphur, will probably not attack iron or steel, but when oxidized, and in the form of $H_2 SO_4$ there is little doubt about its destructive properties. It would seem that such corrosion may be set up by any concrete with aggregates of cinders, coke breeze, destructor refuse, clinkers or slag. No weakening of the embedded steel may be developed for years, but the latent possible danger with such aggregates is surely a very serious matter, and one which demands the close attention of the constructional engineer.

A material which one often hears recommended as an aggregate for concrete used in the construction of fireproof floors is coke breeze. This material is favored by the contractor on account, principally, of its cheapness in cost, its comparative lightness, and its so-called fireproof qualities. What is really meant by the term "coke breeze" is no doubt the clinker of coke, but what is used as "coke breeze" is generally the smaller lumps riddled out of coke. It seems to me that it would be quite as efficient, so far as fireproof qualities are concerned, to use small coal as the aggregate for the concrete, and in both cases the result would be equally fireproof. I need hardly add that failure in such an instance under the test of an actual fire is probable, and in several cases has actually occurred.

It will be asked, then, which aggregates are the safest to use for concrete in buildings designed to be fireproof. After having given the subject the most careful attention, and viewing the matter not solely from the standpoint of fire-resisting qualities, but also from a standpoint which is, after all, of the first and most essential importance, namely, the permanence and durability of the structure itself, I have come to the conclusion that the materials which may most safely be used are the pure natural materials, for example broken whinstone, which is of a volcanic nature, or gravel. Concrete made with natural aggregates may have slightly less resistance to the action of fire than concrete made with certain artificial aggregates, such as coke breeze, clinker, destructor refuse, or slag, but the difference is one of degree only, and is not important. Moreover, this difference is more than counterbalanced by other advantages in favor of the natural aggregates, as concretes made with certain artificial aggregates are not so reliable in their uniformity in resistance to crushing or tension, and therefore under stresses, from whatever cause resulting, I would be inclined to place greater reliance on the more uniform and stronger material. In addition to this, as I have already stated, there may always be the possibility of the presence of sulphur in such artificial aggregates which, by chemical action, may ultimately affect the structural steelwork, and consequently the permanency and safety of the building. On the other hand, it is universally recognized that concrete made with pure natural aggregates and of sufficient density will absolutely protect steelwork embedded in it from corrosion or oxidation.

I would now refer shortly to the method of encasing the structural members. The concrete should be run in round the column, stanchion, joist, girder or lintel in a plastic state and thoroughly keyed to the structural member by means of wire ties or expanded metal. The minimum thickness of the protecting coat of concrete is stated by the rules to be 1 inch. I am afraid that the word "minimum" will in most cases be read "maximum," and that what will result in actual practice will be a maximum thickness of 1 inch. In my opinion this would not be sufficient. The thickness of the protecting insulation should be proportioned to the sectional area of the structural member protected, and clear definition in this matter laid down. It can be readily understood that the thickness of insulation required for a light joist and for a heavy girder should not be the same, and therefore that the larger the sectional area the thicker the protecting material should be.

The rules also specify that the insulating material must be "keyed" into metal supports, but a definition as to what is intended is not given. To form a satisfactory bond with the structural member, say an ordinary rolled steel joist, it should be wound round with thin wire or expanded metal (but the latter if used should be of a very open mesh). The concrete should then be run round this in a wood mould, and thoroughly consolidated in place by means of ramming, so that the wire ties or expanded metal are thoroughly interlaced with it.

(To be continued.)

ILLUSTRATIONS

ONTARIO POWER COMPANY, NIAGARA FALLS, ONT.

A letter from Messrs. Green & Wicks, which was written as an expression of opinion on the treatment of reinforced concrete, but which arrived too late to be published in our special number of May 4, refers particularly to these buildings and is therefore printed in full below:

We believe that your statement that architects have been more concerned up to this time with the difficulties of the actual construction in reinforced concrete than with the final architectural effect of the completed structure is true.

Owing to the rapid advance of this mode of construction, the supply of skilled workmen is limited, and therefore the difficulties are multiplied.

We have tried many of the methods now before the public and find that there is a great deal of erroneous information, and that these methods do not always work out as predicted.

Necessarily, the ordinary concrete block does not lend itself to an architectural treatment. Neither does a monolithic wall, which is cast between wood forms erected in place, give the desired results. In many locations the cost of this monolithic construction is greater than a brick wall, and the color of the concrete is cold and forbidding.

We have therefore settled down to the method of designing our concrete buildings with a frame of reinforced concrete, filling in the space between the columns with a slab from 4 inches to 6 inches thick, or with a 4-inch or 8-inch brick curtain-wall, leaving galvanized iron anchors projecting on the exterior 3 inches to 4 inches. The exterior is then laid up of concrete blocks, cast in a sand mould (under the Stevens patents). These blocks are made of any size or shape desired, and are from 4 inches to 6 inches thick. This exterior course or veneer is laid up, leaving a space of 4 inches, which is filled in with concrete as the work progresses.

This exterior veneer is actually an artificial stone, and with some manufacturers it has progressed so that it is impossible to tell the difference between it and a real stone like Indiana limestone. A great deal depends upon the mixture used, the kind of cement, and the whole operation must be handled with care and intelligence. The facing of a structure with a high-class cast-stone veneer is not difficult, and is quite economical. The exterior surfaces are tooled or finished in any way desired, the methods used being similar to those used for real stone. This is done at the factory, where it is manufactured with the use of special air tools. This method has been followed to a large extent in and about Toronto, the cast stone made in this manner being used in combination with other stone and with brick.

Our first attempt with this artificial stone was on the Ontario Power Company's building, Niagara Falls, Ontario. The artificial stone was manufactured and put in place by the Roman Stone Co., of Toronto. The surfaces were tooled, and in all respects the work was carried out by the same methods used for real stone.

In the construction of these buildings, the cast-stone veneer was used in place of an outside form, which would have been required had the walls been of monolithic concrete. Thus the cost of the wood form was saved. This facing is set up by methods similar to those employed in laying up cut stone. The inside form is eliminated by the use of a 4-inch brick wall, and the intervening space filled with plastic concrete.

This method has since been very satisfactorily applied to larger buildings, such as offices, apartments, etc., and even more satisfactory results are being obtained by the use of porous terra-cotta blocks, which are set up similar to the outside facing in place of inside forms. The walls are constructed as above described. The steel ties projecting from the back of the stone are laid in the joints of the terra-cotta and the intervening space filled with high-class plastic concrete. This permits of plastering directly on the porous terra-cotta and has the distinct advantage of having the hollow spaces in the wall, which is pro-

vided by the terra-cotta, making an even warmer and dryer wall than the other method.

Concrete is, beyond doubt, an excellent structural material, but, in our opinion, it is best for the designer who is looking for artistic effects to confine the use of concrete to its proper sphere, that of structural purposes only, and reserve for artistic effects the use of the older and surer materials, such as brick, stone, terra-cotta or manufactured stone of the higher grades.

In regard to cost this system of construction compares favorably with a monolithic wall which has been finished either by hand or machine tooling, or other methods of finishing the surface, and has the distinct advantage of assuring the designer that his most intricate detail will be properly executed; that the surface and texture of his facing will be of the very highest class, and eliminates all possibility of flaws produced in the surface by the improper filling of forms or accidents in the removal of same.

Yours very truly,

GREEN & WICKS.

ONTARIO POWER COMPANY'S BUILDINGS, NIAGARA FALLS, ONT. MESSRS. GREEN & WICKS, ARCHITECTS, BUFFALO, N. Y.: FIVE PLATES.

HOUSE OF F. M. NICHOLAS, ESQ., UNIONVILLE, O. MR. FRANK B. MEADE, ARCHITECT, CLEVELAND, O.

HOUSE OF L. A. AULT, ESQ., EAST WALNUT HILLS, CINCINNATI, O. MESSRS. ELZNER & ANDERSON, ARCHITECTS, CINCINNATI, O.

HOUSE OF B. D. NICHOLS ESQ., GLENCOE, ILL. MESSRS. SPENCER & POWERS, ARCHITECTS, CHICAGO, ILL.

Additional Illustrations in the International Edition.

HOUSE OF U. G. ORENDORFF, ESQ., CANTON, ILL. MR. R. C. SPENCER, JR., ARCHITECT, CHICAGO, ILL.: TWO PLATES.

HOUSE OF J. D. MAC NEAL, ESQ., MADISON ROAD, CINCINNATI, O. MESSRS. ELZNER & ANDERSON, ARCHITECTS, CINCINNATI, O.

HOUSE OF J. S. WALKER, ESQ., HORTENSE PLACE, ST. LOUIS, MO. MR. G. W. HELLMUTH, ARCHITECT, ST. LOUIS, MO.

NOTES AND CLIPPINGS

LIBRARIANS AND ARCHITECTS.—So habitual has it become for librarians, in discussing library buildings and plans, to make wholesale criticisms of architects and to assume towards them an atttitude of superior wisdom, that it is said, on the authority of one of the leading architectural firms of this city, that architects are coming to feel a grievance against the library profession and are somewhat loath to enter competitions for library buildings. Commenting on this situation, a librarian who has perhaps had as much to do with architects and building plans as any in this country, recently expressed to the writer the opinion that the attitude thus assumed by librarians was based chiefly on ignorance and narrowness, and was likely to do both the library and the architectural profession a real injury. What ground there is for this feeling on the part of librarians, he said, is found in the defects of a few conspicuous buildings, built at a time when the full demands to be made by the public upon the buildings were realized neither by librarians nor architects. Of late years, he said, architects have been studying with great care and minuteness the economic and practical demands of library buildings, and as a whole are now far in advance, even in these matters, of the average librarian. From an experience gained on many building-committees, by some of which buildings costing millions have been planned, he has come to the conclusion that the librarian, even in his own field of library economy, has much to learn from the professional architect.—*N. Y. Evening Post.*

OLD LYME'S LOSS.—Lovers of old New England meeting-house architecture, says the Boston *Transcript*, will be grieved to hear of the loss by fire of the famous example at Lyme, Conn. Old Lyme is, itself, one of the most beautiful examples of the town of homes of affluence in Colonial times. Its broad main street with the double row of arching elms, now all patriarchs of distinction, was lined with the houses of Colonial grandees representing the wealth, taste and culture of the New England of the seventeenth and eighteenth centuries. Some of these houses exist in their original forms to-day, and a few are still tenanted by lineal descendants of their first proprietors. One of them has been for years the special favorite of some of the most distinguished painters of New York and of the country, such men at Hassam, Will H. Lowe, and Metcalf, Poore, of Philadelphia, and Griffin, of Hartford; Ranger, C. H. Davis, Talcott, Simmons, the Wigginses, father and son, are in the neighoborhood or in adjoining towns. So great a veneration have the artists for the Griswold mansion, which is their summer rendezvous, that it goes by the name of "The Holy House" (a sort of sacred temple of the muses) in their everyday talk. They have each of them contributed of their best work to the decoration of its wainscots, doors, and panels, and mantlepieces, painting their landscapes and figures or cattle, as the case may be, directly upon the old white wood. Four great pillars on the front give it the stamp and bearing of Colonial aristocracy. It may be remembered that a representation of this front, with Miss Griswold sweeping up to the front door in her white crape shawl, was one of the finest pictures in Mr. Metcalf's exhibition at the St. Botolph last winter. It won the Corcoran prize and was purchased for the Corcoran Gallery. The church which has just been destroyed had the four lofty Ionic pillars as the front of the Griswold house. The broad, many windowed body of the church was surmounted by a steeple which, like all spires of its kind, was attributed to Sir Christopher Wren and was certainly after that school. All the great artists who frequented Lyme and the multitude of their pupils "take a hack," as they say, at the old church, or rather, have always done so, but will now do so no more.

ENLARGEMENT OF THE BRITISH MUSEUM.—King Edward laid the foundation-stone of the important additions to be made to the British Museum, with elaborate ceremonies, the other day. Part of the new work has been done already, and when the whole has been finished the proportions of the structure will be much more commodious than at present. But the present extension is only a step toward the completion of the perfected plan, which, according to the existing designs, will finally cover a square area of thirteen acres. The cost of the present improvements will be about $1,000,000. The new buildings, which are in the rear of the old structure, consist of a basement and sub-basement which will afford large storage space for printed and other material. Above these will be an extensive range of galleries for library purpose. Higher still will be a floor devoted to various studies and to students' rooms, and over all 380 feet of galleries in which the Egyptian and other collections will be displayed. Mr. J. J. Burnet, of Glasgow, is the architect. King Edward has been a trustee of the Museum for many years, and has proved his active interest in the institution in many ways.—*N. Y. Evening Post.*

EDWARD KEMEYS, SCULPTOR OF ANIMALS.—Concerning the work of the late Edward Kemeys, who died at Georgetown Heights on May 11, Leila Mechlin writes in the *Washington Star*: "Not only did he seek out the wild creatures in their own environment and intimately study their characteristics and habits, but he gave to his interpretations such form that they merit permanent preservation. He was a sculptor not only by training, but intuition. Self-taught, his conceptions were essentially plastic, and his feeling for form inherent. Though the weird and mystical appealed to him strongly and many of his bronzes found their inception in a legend or a poem, the literary interest in his works was always subordinated to the requirements of art. His sculptured forms show definite relation to the lump mass, his groups compose well from all sides, and each work exhibits good lines and significant handling of light and shade. All have solidity as well as unity and meaning. And though his work was thoroughly studied and is anatomically correct, it displays a lightness of touch which bespeaks the master—not technical finish, but loving execution. None ever approached his profession with greater reverence than he, and but few have left a nobler record. A man of broad vision, he wrought for all time. Some of the larger and best known of Mr. Kemeys's works are the "Still Hunt," in Central Park, New York; the "Wolves," in Fairmount Park, Philadelphia; "The Prayer for Rain," in Champaign City, Ill., and the "Lions," in front of the Art Institute of Chicago, but his smaller and less familiar bronzes merit no less distinction. A small collection of these are in the Chicago Art Institute, and the models of fifty or more are to be seen in the National Gallery in this city. These alone should insure his being held in continual and grateful remembrance."

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SOCIETIES, PERSONAL MENTION, ETC.

THERE are indications declaring themselves from several directions that architects, both in this country and in England, are getting ready to debate seriously the propriety of attempting to reform the accepted method of computing the remuneration of an architect for his work. The system as it exists in this country is simple in application, and nowadays is pretty generally understood by the public and accepted without too much demur by the courts, but it is crude and inequitable, and its routine application to all sorts of differing situations and conditions has the disagreeable effect of reducing the members of a liberal profession to the grade of members in a trade union, as the public understands the matter. Theoretically, the five per cent. rate was suggested as a fair "minimum" rate, the expectation being that as a man gained name and fame he could and would charge and collect a larger fee; but practically there are very few who have attempted to charge at a higher rate, and the maximum rate is, generally speaking, five per cent. flat, and before the modern methods of building became current, when buildings were of moderate size, and before architects had organized their offices on a factory basis, the system worked fairly, except in those cases when, as now, it was wholly inequitable.

AN even rate of five, or any other, per cent. would seem to imply that the cost factors in the several problems should be essentially comparable, that the efforts for which proportional payments are demanded should be practically identical. That is, if five per cent. is a proper architect's fee on a million-dollar office-building, then an architect should be able with exactly the same expenditures of time, thought, effort, labor and skill to earn a similar fee of fifty thousand dollars by the designing and supervising the construction of five two-hundred-thousand-dollar country-houses for equally particular individual owners, or a church, a theatre and a hospital at three hundred and fifty thousand dollars each, and every architect knows this cannot be done. The inference then is, clearly, that the architect is paid too much for the office-building, or not enough for the others. But as it is the architect who has established the rule and forced it on the public, it is of no consequence to the latter, so far as equity is concerned, whether he earns less for his five houses than he does for his office-building, always assuming that in that case five per cent. is a proper charge. But, is it? Suppose a skyscraper of the commercial type has been designed—an architecturally treated stone base, a plain brick middle body punched full of window holes and an elaborately be-corniced upper section—and the working-drawings practically completed; suppose the owner discovers at this point that, to have a paying investment, he must have more room to rent, and the architect must add four more stories. The architect inserts these, of course, in the plain middle body where the arrangement of rooms is "typical," cuts his elevations apart, makes new tracings and blue-prints, changes a few figures on the framing-plans at an outside cost of five hundred dollars, and collects, with gratitude, five per cent. on the fifty thousand dollars the four new floors have cost the owner. But has not the owner been inequitably charged for the time and effort the architect spent on the alteration? To be sure, if the case had been reversed, the architect would have, as blandly, eliminated four stories from the middle of his building and been two thousand dollars the poorer. An instance of this sort suggests that the method is inequitable and unscientific.

IT is easy to show, and has been shown over and over again, that, charging at a five per cent. rate, an architect who does a fairly active business of a good type earns only a fair and modest living, no greater than thoughtful persons would be likely to concede was due to his skill. But, when such an architect's books are analyzed, it is found that on much of the work done there was little net profit, on some of it there was none at all, while on other parts the profit as compared with the cost was really handsome, and yet all the clients had been billed at the same rate. The inference is plain: the client who had paid the handsome profit had really been making a present to that other client, a stranger, whose work had yielded to the architect less or no profit. There is clearly inequity here: it is no part of an architect's duty, or right, to levy a forced contribution upon one client for the benefit of another. It is of no concern to clients that the five per

cent. rule enables an architect to make "in the long run" a reasonable living, while it is of the greatest concern that no one of them should be forced to spend his money unfairly, unwittingly and unwillingly.

THE inequitableness of the five per cent. rule shows out when we consider the matter of machinery, for the architect's income from a tax on this part of his client's outlay may wax or wane in a very curious way. As it is the architect's duty to construct a building for his client in complete working order, it is proper enough under the present system that the cost of heating and ventilating apparatus, pumps, elevators and the ordinary mechanical apparatus that are installed in modern buildings should be included in the total cost upon which his fee is computed. But, suppose, in the case of an office-building, say, the client and architect had all along meant to install an elaborate and costly steam plant, five per cent. upon the cost of which would yield the architect a very pretty sum, but that at the last moment the client decides to put in a motor and take electric current from a power company. The client makes a saving in prime cost and also another saving at the expense of the architect, who loses his expected commisson on the steam plant, and yet has, in our practice, no reasonable ground for complaining. But does or does not the converse of this indicate that the architect would collect a fee to which he had no equitable claim? If the client adheres to the steam plant idea the architect gets a fat fee on the plant, or he loses it if a motor is substituted; but in neither case does he do anything at or after the time of making the decision to earn any fee at all; the building is already planned and will be built with engine-room complete, and on that building the architect can collect the standard fee; but the installation of one or another kind of machinery may be decided by the client's whim, and that whim may seriously affect the architect's pocket—and temper. Clearly such a case as this reveals an element of gambling that is undignified, and a system which admits of gambling can hardly be held to be scientific.

PROBABLY nothing can be devised that will work more satisfactorily than a system of charging a percentage on cost, but it is time that there should be a classification of buildings, to each of which classes a separate rate should be appropriate and fair, for owner and architect alike. As our municipal building-laws and the underwriters' rules recognize fresh and more classifications each year, and as architects are parties to the introduction of such classifications, often urging and insisting on their making, there seems no good reason why they should not incorporate similar classifications into their own schedule of fees. The matter seriously needs attention, and partly because, if it should be undertaken, and it ought to be, it would give a very good chance to thresh out and determine how, by whom and at what rate engineering and other experts—whose aid has become of such importance during the last score of years—shall be paid.

THE situation as to architects' fees in England is at once better defined and yet more complicated, and we must confess to not understanding the bearing of all the conditions there; for example, we do not understand why an English architect recounting, recently, how his own son had just entered on a career, should have said that this son had taken up "that especially lucrative branch of the architectural profession, quantity-surveying." "Especially lucrative" is an enticing phrase to have properly attaching to any branch of the profession, but we had not understood before that quantity-surveying was anything more than uninteresting and laborious. Perhaps, just as the solicitors, not the barristers, are the members of the legal fraternity who are enabled to leave fortunes to their children, the quantity-surveyor is the moneyed man of the architectural profession in England. The further fact that the quantities are paid for by the contractor, not by the architect, nor yet directly by the owner, would suggest that quantity-surveyors have to be men of the utmost rectitude, not open to any form of bribery, and, generally speaking, we understand that the men who adopt this calling are of excptionally high character.

A RATHER unusual defense is set up in the case of Messrs. Henry & Son, of Akron, O., against T. K. Albaugh, the architects having sued for their commission for designs for the Grand Opera-house at Akron, which plans were finally discarded in favor of those prepared by another architect. The defendant, in his answer, alleges that he was obliged to abandon Messrs. Henry & Son because they resolutely refused to alter their drawings to meet his requirements, and that this step was forced upon him by the evils flowing from the delay caused by a seeming deadlock, and it is easy to see that where the "opening" of a new theatre is concerned a delay is an unusually serious and costly matter. It does not appear what instructions were given by the owner that the architects refused to comply with; but unless he was trying to insist on some breach of the local building-law, or the gross violation of some principle of construction, it seems to us that his novel defense is likely to prove sufficiently valid for his purpose.

THE Separation law in France continues to afford interesting developments, and it is worth while to mention one of the latest, though it is questionable how far it may be proper to do so in an architectural journal, seeing that its connection with the preservation of church fabrics is somewhat remote. It now appears doubtful whether the State is going to be as greatly benefited as was anticipated by the confiscation of the Church funds, for already, in various parts of France, suits have been brought against the State by the heirs-at-law of individuals for the repose of whose souls, through the perennial celebration of masses, certain moneys or properties had once been turned over to the Church. As the masses can no longer be celebrated, a breach of contract has been operated, and in the cases already decided the courts have ruled that the heirs-at-law can recover from the State which forced the breach of contract, and now holds the funds. What the anguished souls in Purgatory will now do is not so easy to guess.

Standard Fire-resisting Construction[1]—II

THUS far we have considered only the problem of efficiently protecting structural steelwork. Let us now consider the steelwork itself.

As we have seen, it is the steelwork which is really the source of trouble, because under high temperatures it tends to lose all or a large proportion of its strength, and finally, when the diminution of resistance to strain is sufficiently far advanced to sag and then collapse.

Metal-framed structures are being largely adopted in the present day, and it is quite common to find massive stone or brick walls wholly carried on metallic pillars and beams, so as to give large window space. In such circumstances concentration of metallic members and heavy sections is essential for constructional purposes, but such concentration accentuates the weakness of the structure as a fire-resisting building, and this even where insulation is carried out.

It will be obvious, therefore, that if the metallic members can be, so to speak, decentralized and diffused, and heavy sections avoided, it will be possible to effect better protection or insulation to each metallic structural unit. This brings me to that portion of the rules of the Fire Offices' Committee headed "Ferro-Concrete or Reinforced Concrete Construction," a form of construction which gives effect to this idea of diffusion of steelwork, reduction of steel sections and more adequate protection of the steel.

The meaning of the term "Ferro-concrete or reinforced concrete construction" is defined by the rules to be "buildings constructed with concrete reinforced in every part with embedded metal rods or bars spaced not more than 12 inches apart, securely connected or overlapping at least 6 inches at all abutments and intersections, having also bands or bars across the thickness of the concrete."

Comparing a rolled steel joist and a ferro-concrete beam, the difference in the cross-sectional area of steelwork is very marked. In the rolled steel joist there is a relatively heavy concentrated mass of metal, difficult to protect efficiently against fire and wide temperature fluctuations. In the ferro-concrete beam there are a number of steel bars of small cross-sectional area, and these bars are absolutely embedded and surrounded at every point by a monolithic mass of concrete. It should be also noted that this concrete forms an essential part of the beam; it is not merely a protective skin or coating; it is a solid jointless mass thoroughly rammed and consolidated, and in which the steel bars are completely embedded. This principle of construction can be applied throughout the building without using any combustible material.

I have stated that such a building approximates more closely than any other to fireproof construction, and my reasons for this statement are:

(1) The non-concentration or diffusion of the structural metalwork throughout the mass.

(2) The thorough encasement of the relatively small metal sections by the concrete.

(3) The solid and monolithic character of the resulting structure and the absence of joints.

(4) The absence of concealed spaces.

(5) The complete absence of combustible structural material.

In a paper read before the International Fire Congress at Milan, by Mr. James Sheppard, Chief Surveyor of the North British and Mercantile Insurance Company, the author stated that "experts in reinforced-concrete buildings agree that to obtain the best results (considered only from a structural point of view and under normal conditions) reinforcing rods must be placed near the outer surface of the concrete, a thickness of 1 inch in front of the rods being generally adopted, but this thickness is altogether insufficient for the protection of metal rods against a serious fire." Now I may say, in a word, that in actual practice 1 inch thickness is certainly sufficient for the small sections, and a greater thickness is given for the larger sections. To illustrate what I mean, if 2 inches thickness is required for a bar 1 3-4 inches diameter, then surely 1 inch is more than ample for a bar 5-16 inch diameter. The rules of the Fire Offices' Committee seem to meet this aspect of the matter by providing "that no rod or bar shall be nearer the face of the concrete than double its diameter, and that such thickness of concrete shall not be less than 1 inch and need not be more than 2 inches." A very interesting suggestion was also made to the effect that the outer skin of the concrete might be made with a different concrete with an aggregate of high fire-resisting qualities. To carry this out in actual practice would, I fear, involve considerable additional expense.

The Congress passed a resolution as to the nature and size of the aggregate (which should be able to pass 1-inch mesh), the nature and fineness of the cement, and as to the method of protection of angles with angle irons, with all of which I am in complete agreement.

I also understand that the British Fire Prevention Committee are about to undertake a full set of tests to determine the different values of various aggregates in concrete for fire-resistance, and this body has already made and issued the results of a large number of tests on the subject.

Such research work is very valuable, but, as regards concrete, these tests have always struck me as requiring a good deal of careful consideration. I do not suppose that any one of the various concretes subjected to these tests is older than, say, three months. Now at that age the concrete must still, in the heart, contain considerable moisture, and under the application of intense heat this imprisoned moisture will become converted into steam, and everyone knows the expanding properties of steam, which will tend to the disintegration of the practically still "green" concrete. If a porous aggregate has been used, such as the clinker of destructor refuse, the steam will probably find a ready means of escape, or the moisture will sweat out under the application of heat without becoming converted into steam. But with a dense gravel concrete the steam, by reason of the density of the mass, will not be able to find a ready means of escape, and will tend to disintegrate the concrete. I do not think this will be evidenced by actual bursting of the concrete, but rather by a large number of small fissures being opened up, separating the mass, and causing pieces to fall off on the application of a powerful jet of water.

Now, in a building which has been constructed for, say, a year this moisture would have almost entirely disappeared, and as time went on would become more and more infinitesimal, and the conclusion to be deduced from this is that the resistance of gravel concrete to the action of fire will increase with age. I venture to offer this suggestion for consideration, as it seems to me that this may have a considerable bearing on the results of tests made on what is practically "green" concrete.

I hold this view because I have had experience of the result of a fire in a building wholly constructed in ferro-concrete where river gravel was the aggregate used for the concrete. The building referred to is a very large warehouse, seven stories in height, and occupied for the storage of various grocery stocks. It was constructed in the year 1900, and during the night of January 11, 1906, a fire broke out on the third floor, amongst a large stock of bran in bags. The origin of the fire was attributed to that well-known culprit, "spontaneous combustion." The bags of bran were closely stacked over an area of 45 feet by 15 feet, and to a height of 9 feet 6 inches and within 1 foot of the ceiling. The firemen took about two hours to force their way to the seat of the fire, and when they did so they directed their hose jets on the concrete ceiling over the centre of the fire, so that the water would fall directly into the heart of the mass of glowing bran. Centered on the same spot for about one hour, they kept these jets, which were working at a pressure of about 100 pounds per square inch. Owing to the force of the water and the length of time it was directed on the intensely heated concrete, small portions became disintegrated, and ultimately some of the steelwork was exposed. The floor, however, stood, and after the fire had been extinguished was found to be but little affected. Some of the beams and pillars were in places slightly fissured. But to my mind the outstanding feature is that no structural member gave way or became distorted or warped, or was rendered unable to carry the loads on the floors

[1]A paper by Mr. F. Macdonald, read before The Edinburgh Insurance Institute, and here continued from page 23, No. 1647.

above through loss of strength on account of the high temperature. The structure not only stood under the most trying conditions, but also, thanks to the thorough fire-resisting construction of the whole building, this severe fire was confined to the apartment in which it broke out. I was informed that the damage to the building cost the trifling sum of £50 to repair, and the damage to stock was valued at £800. On the other hand, I roughly estimate that at the time of the fire the total value of the building and its contents would be, approximately, £50,000. Such a result demonstrates the value of this form of construction in its resistance to fire.

Another example may be cited. An ordinary brick building at Baltimore, six stories in height, had its former wood floors removed and these replaced by ferro-concrete floors within the existing brick walls. These new floors, however, were supported on independent columns of similar construction, and had practically no bonding with the brickwork. The floors were of the flat-arch type, and 4 inches thick at the crown. During the recent conflagration at Baltimore the fire passed round this building, and is said to have levelled all the buildings in the same block with it. Part of the outer brick walls of this building fell away and exposed the concrete work, and the remainder of the brickwork had all finally to be taken down. Notwithstanding the falling away of part of the brick outer walls, the concrete construction stood, and, apart from slight cracks, showed no sign of deterioration; indeed, it is stated that on actual loading tests being made the floors were found as strong and serviceable after the fire as they had been before it. Be this as it may, it is remarkable that the concrete construction should have stood as it did, in view of the ordeal to which it was subjected. The concrete for this building was made with an aggregate of broken stone.

One other reported instance may be of interest, and it is one of the most remarkable. It refers to the six-story factory of Messrs. Kleyer, at Frankfort, occupied for the manufacture of cycles. The building was brick built, with ferro-concrete floors, beams and internal pillars. A fire broke out in the fourth floor, where a large stock of celluloid was stored. An explosion took place when the fire reached the celluloid, blowing out the brick walls of the upper floor, lifting the roof off, and causing the upper floors and the whole mass of débris to fall on the third floor. The impact of this must have been terrific, and one would certainly have expected that in such circumstances the whole structure would have completely collapsed. It is stated, however, that not only did the floor of the third story support the impact, but also that it remained sufficiently solid to prevent the fire from the burning mass of débris imposed on it passing through the floors beneath. Comment on such a satisfactory result as this is needless.

Turning now to the rules of the Fire Offices' Committee which apply to this class of construction, I have one or two remarks to make. It is provided that no floor must be less than 5 inches thick. Two or three years ago the minimum thickness for floors was 6 inches. Since the issue of these rules this has been reduced to 5 inches, and I hope that the minimum thickness may ultimately be reduced to 4 inches. My reason for expressing this hope is that, in economy of design, the designer is considerably hampered by this rule, for there is in the design of such work an economical mean between the relative proportions of concrete and steel employed, and in the majority of cases 4 inches thickness of concrete with a slightly larger proportion of steel is more economical than 5 inches thickness with less steel. In both cases the insulation of the embedded steel is complete, for the floor bars are always of very small cross-sectional area, rarely exceeding 7-16 inch diameter. There is also another important point as regards economy of design in connection with this rule to which I would draw your attention, namely, the considerable difference in deadweight between a floor 5 inches thick and a floor 4 inches thick. As is well known, concrete is a very heavy, dense material, weighing approximately 1 1-4 cwts. per cubic foot. The result is that the designer, being forced to increase the thickness of the floor beyond what is necessary for actual strength, coupled with economy in design, is also, by reason of the increased deadweight involved, forced to increase the strength of all supporting beams, columns and column bases. This is a serious consideration as regards capital cost, and it, of course, becomes accentuated in proportion to the height of the building. I think the Fire Offices' Committee might take this into consideration. I am confident that in many risks a 4-inch floor will form an effective horizontal fire-break, especially in cases where the building is well cut up by horizontal fire-breaks in the shape of floors, and vertical fire-breaks in the shape of internal party walls.

It is unfortunately the case that in almost every instance fire-resisting construction has to fight for adoption against the much cheaper ordinary non-fireproof construction of stone or brick walls with wood floors and wood and slate roof, and I think it must in the long run be greatly to the advantage of the insurance offices that fire-resisting construction be adopted, especially for the heavier risks. It would seem to me very much better that a building should be constructed with fire-resisting floors 4 inches thick rather than combustible wood floors. But the tendency of the rule as to minimum thickness is to increase initial capital outlay (so far at least as ferro-concrete floors are concerned) to such an extent that the proprietor may ultimately decide to do without fire-resisting construction altogether, so that this important aspect of the matter might well be given further consideration by the insurance offices, with a view to giving every possible encouragement to the more general adoption of better and safer methods of construction.

Let me state an actual instance which recently occurred in my own experience of how economy of design is affected by these rules, and the effect on the ultimate result of the competition between fire-resisting construction and ordinary construction.

A firm of printers decided to build a large five-story warehouse to be occupied wholly as store for paper in bulk, and for their own safety and for the continuity of their business they decided to adopt fire-resisting construction, provided the cost was not too excessive as compared with ordinary non-fire-resisting construction. There was no exposure hazard on three sides of the proposed building. On the fourth side there was an exposure hazard, which could have been met without difficulty in the design.

In the first design for the proposed new building (which was made solely with a view to economic design) a thickness of 4 inches in ferro-concrete was adopted for the floors, and also for the outer wall-panels on the sides where no expose hazard existed; but subsequently, in order to conform to the rules, the thickness of the floor was increased to 5 inches, and that of the outer wall-panels to 6 inches, at an increased estimate of capital cost of approximately £1,000. But in addition to this it was intimated that party-walls must be built within the building from the ground upwards, so as to limit the cubic capacity, and this stipulation proved fatal to further consideration of fire-resisting construction, as the firm stated that these internal walls would seriously interfere with their working arrangements, and that the advantage offered them as regards rate was not important. I think that the rate quoted in case of ordinary non-fireproof construction being adopted was 7s. 6d. per cent. for building and contents, and that if fire-resisting construction in accordance with the rules were carried out a discount of 25 per cent. was, I believe, offered on this rate. The firm also stated that if they adopted ordinary construction they would not be hampered with any restrictions as to cubic capacity or constructional details, and they ultimately decided to abandon fire-resisting construction entirely and adopt brick walls and wood floors.

The estimated value of the building in question is approximately £8,000, and of the contents £30,000. The probability is that if a fire takes place in it as now constructed a total loss to the insurance offices interested will result, whereas if even a modified scheme of fire-resisting construction, coupled with intelligent design, had been encouraged and adopted, there can be but little doubt that the consequent loss in the event of fire would be much restricted; and also that the probabilities of a fire taking place would be much less.

With reference to internal party-walls intended to act as "fire-break" walls, the rules stipulate that these shall not be less than 13 inches thick. It seems strange that 15 inches thickness should be recognized as sufficient for a horizontal fire-break in the shape of a floor, and that for a vertical fire-break in the shape of an internal party-wall a thickness of 13 inches should be asked for. If 15 inches thickness will act as an effective stop in the case of a floor, it will surely do so in the case of a wall. Perhaps it may be thought that a ferro-concrete wall of this thickness would not resist a lateral thrust, such as a blast of flame, or heavy articles falling against it. Such, however, is far from being the case; on the contrary, the resistance of a ferro-concrete wall to lateral thrust and pull is very great. To illustrate this I may say that I have seen an outside iron staircase weighing ten tons bracketed onto a ferro-concrete wall-panel 4 inches thick.

This question of thickness of party-walls is really exceedingly important.

Some years ago I was engaged on the design of a large fire-resisting building four stories in height, measuring 160 feet in length by about 35 feet in depth over all. The ground floor is occupied as a power wood-worker's and pattern-maker's work-shop, and contains a large number of power-driven machines and benches. The upper three floors are occupied as stores for wood patterns, being filled from floors to ceilings with wood goods. The firm made it a condition of design that the ground floor (which was used as a work-shop) must be free of internal pillars, that is to say that the main transverse beams required to have a clear span across the internal width of the building, which, to be exact, was 33 feet 1 inch. It was manifestly most desirable to limit the large area of these upper floors stacked with wood goods by sub-dividing them up into three or four separate compartments by means of transverse "fire-break" walls, but it was also manifest that to impose the deadweight of a 13-inch wall on a beam having 33 feet clear span in addition to the floor loads would be a decidedly expensive matter. Still, to limit the area in the upper floors so as to prevent a whole story becoming involved at the one time, it was decided to construct ferro-concrete transverse walls, but only 4 inches in thickness, so as to lessen the dead load on the large-span beams. Each of these party-walls had one doorway opening therein, which was to be protected with a single metal-covered door. The intention of this, of course, was to form vertical fire-screens between the horizontal fireproof floors, so as to limit the area of a fire in its first stages. This precaution was intended to be taken not so much with a view to securing a reduction of rate of premium, but as an effort to carry out the design of a fire-resisting building so far as it was possible to comply with the structural requirements of the proprietors for their occupancy; that is to say, the internal "fire-break" walls could not be built up from the ground on account of the requirements of the proprietors for their work-shop. The transverse "fire-break" walls, 4 inches in thickness, were duly constructed on the upper floors, but before the doorway openings in them were protected by single metal-covered doors, as intended, the insurance office interested surveyed the risk and intimated that such walls, as party-walls, were useless, not being of the required thickness. In view of this the proprietors decided not to incur the expense of protecting the doorways, and, so far as I am aware, the doorways in these walls remain unprotected to the present day.

I am quite confident that such walls with protected doorways would afford very considerable opposition to the spread of fire from one section to another, and that for a sufficiently lengthened period to allow the fire-brigade to get into action and overcome without much difficulty a fire confined to one apartment, instead of having to face an entire story 160 feet in length well alight. Surely, therefore, such precautions have some value and deserve, better, recognition than condemnation as useless effort.

This I would respectfully submit is the outstanding fault of the present rules. Better building methods are coming into favor very slowly, and the reason for this is not difficult to find. Better building methods and fire-resisting construction require increased capital expenditure, and proprietors who are called on to pay this increased cost will only do so up to a certain point. If a too perfect standard is set up it generally becomes unattainable on account of cost.

There is a continual struggle for adoption between fireproof and non-fireproof construction, and there can be no doubt that the advice and the attitude of the insurance offices are considerable factors in determining the result. I am aware that many insurance officials formerly held the view that "fire prevention" was of no interest to them, and that their business was to rate risks as they found them. I do not know whether this is the view held at the present day; I hope it is not, because, as I have said, the influence of the insurance offices is so great that concurrently with regard to their own financial interests much can be done by them to diminish the annual fire-waste in the country; and surely this is the higher side of the business.

Another factor in the slow progress of fire-resisting construction in Great Britain is that perhaps but few architects have time to make a special study of this branch of work. The designing of a structure intended to be fire-resisting, and where a severe fire risk resulting from the occupancy or from exposure is generally always involved, seems to me to demand not only a knowledge of special constructional work, but also of the fire risk arising out of the intended occupancy, and neither of these subjects is a matter of everyday experience or interest to the majority of designers. The consequence of this is that the summit of most efforts towards the design of fire-resisting building is the specification of some commercial firm's patent fireproof floor, and the type of floor selected is generally decided by which firm offers the cheapest price, and not by the merits of the floor. In such circumstances many buildings have been constructed and designated "fireproof" when, in point of fact, some of them are really as far from being "fireproof" as any ordinary building is, and this has been clearly demonstrated on many notable occasions. To such an extent has this taken place that it has been said it is impossible to construct a really "fireproof" building. But, as I have endeavored to indicate, it is quite possible to construct "fire-resisting" structures of a very high standard; it is not the specification of certain details, however, that will insure efficiency in this respect, but rather the skill and knowledge of the general designer. For this reason anyone who takes the design of such work should, I think, possess some knowledge of all the following subjects:

1. Constructional work.
2. Resistance of materials to fire.
3. Ability to estimate the fire hazard which will arise from the occupancy and exposure.

The first and second of these subjects involve a large amount of special technical training. I have endeavored to indicate in a general manner some of the technical points which are of outstanding interest to those engaged in this class of work, but there are many others which I have not mentioned, and all of them demand exhaustive consideration.

The third of the qualifications I have mentioned is one which insurance officials possess, and which can only be acquired by long training and experience. Few constructional designers possess all three of these qualifications, and even in such cases freedom of action is denied by the rules. However well-intentioned the designer may be, the task given him of serving separate masters in the shape of economy in capital expenditure, constructional requirements and insurance rules, is a difficult one, and it is not infrequently impossible to reconcile all these interests on the present basis.

It is not by the action of an isolated few that better and more intelligent methods of construction will come to be more generally adopted for the heavier fire risks, and which will tend to minimize the annual fire-waste, but by the combined action of the many. And no body of men is more competent, or has greater facilities, influence or prestige than insurance officials to establish and set in motion some system of combined action in this matter.

If, in conclusion, I may venture to make a suggestion, it would be that the Fire Offices' Committee might give consideration to the creation of a standing sub-committee to whom all questions on fire-resisting construction should be referred. Such standing sub-committee, aided by the expert advice of competent permanent officials, could largely supersede the present hard-and-fast rules, and give skilled attention to each individual case and its typical requirements and merits.

I would suggest that such a committee might, through its officials, undertake:

(1) Examination of all architects' and proprietors' plans and specifications submitted to them for buildings proposed to be erected where fireproof construction is intended to be incorporated in the design, and report on such designs to the particular office interested.

(2) Fix discounts for complete "fire-resisting" buildings on the report of the office interested, on the merits of the type of construction employed, details of construction, occupancy, limitations of areas, exposure, etc. Such discounts to be tariff.

(3) General research work, and accumulation of data on fires and fire-resisting construction.

Perhaps this is too bold and progressive a suggestion to make, but I am convinced that the expense of the establishment of a central department specially devoted to this work would be repaid many times over in the first two or three years of its existence. Not only this, but it would make for the good of the general community, on account of the diminution of the annual fire-waste which would certainly ensue, and the consequent annual national saving of wealth.

Hungarian Art[1]

A PASSIONATE love for Art, as well as for Music, is the birthright of every Hungarian. Right from the very earliest ages there were signs of great artistic taste and display among the Hungarians.

St. Stephen, the founder of the Hungarian Kingdom, and the introducer of Christianity into Hungary in the year 1000, had done a great deal during his forty years' reign to encourage the arts and sciences of the country. He founded numerous bishoprics, abbeys and churches, both at home and abroad, the walls of which were adorned by the finest frescos of the time.

Among his immediate successors, St. Ladislaus (1077-1095), the brave and chivalrous king, proved also a true patron of the arts, likewise his successor, Kolomon (1095-1114), the conqueror of Dalmatia. The last named monarch, owing to his great learning and scientific attainments, was commonly known as the "Book King."

That enlightened ruler, Andrew II. (1205-1235), who granted to Hungary in the year 1222 the "Golden Bull" or the Magna Charta of Hungary, a few years after the charter was granted to England by King John, was also a great patron of the arts. Upon his return from Jerusalem as a leader of the Crusaders, he devoted a great deal of time to the reorganization of the State, and likewise to the encouragement of arts and science.

Unfortunately, owing to various internal troubles and strifes, but principally as the result of the Mongol invasion, the art treasures of the country perished and its edifices were reduced to ruins, and the Cathedral of Pécs alone bears witness to the high development of the artistic taste and splendor of that period.

The Basilica of Esztergom, built in the twelfth century, may also be considered of great artistic value, while the renowned church of Ják, with its noble porch, and the church of Lebény, and a number of other churches, are rightly famed in the history of art.

It may be of interest to point out here that in those days the principal churches were erected right in the interior of the country, far away from any city; and these churches were so constructed as also to answer the purpose of places of refuge and defence against the repeated invasions of the Mongol hordes, and other tribes, and these circumstances no doubt accounted for the fact that most of the churches belonging to this period were destroyed during the country's struggles.

With the accession to the throne of Charles Robert, of the House of Anjou (1308), the Italian Renaissance art was introduced into Hungary, both by Charles Robert and during the long reign of his son, Louis the Great, and for the next two centuries art and science prospered throughout the land.

We have only to look at one of those volumes belonging to the famous collection of King Matthias (1458-1490) known to history as the Corvina Library, and we shall at once be convinced of the highly artistic taste which was developed in those days. The wonderful ornamentation and the marvellous miniature paintings in those volumes, which were written on parchment, furnish the best proofs of the great love for art and perfection of workmanship which prevailed during the rule of this great king. No wonder that the Turks during their occupation of Buda attached such importance to the possession of this valuable collection, which consisted of 5,000 volumes.

The Hungarians will always be grateful to the present Sultan for having recently restored to the Hungarian nation a portion of this library, which had been scattered about his dominions and sacredly guarded there for centuries. The volumes were brought back to Hungary in a special train, and the occasion was marked by the greatest national rejoicings. The thanks of Hungary in this respect is due to that eminent Hungarian scholar, Professor Vàmbéry, who, with the consent of the Sultan, was entrusted with the task of searching throughout Turkey for these valuable volumes.

I understand from my friend, Mr. Joseph Offord, the well-known Egyptologist, that one of the MSS. belonging to this library is in the actual possession of Lord Leicester at Holkham Hall, and it is sincerely to be hoped that this will be restored in the near future to the Hungarian nation, the natural custodian of such a priceless document.

In a country like Hungary, where patriotism is as sacred as religion, it is quite natural that the artists of the Middle Ages should have paid equal attention to the execution of subjects relating to national and historical life, and these are represented by the frescos at the Gisella Chapel in Veszprém and the Church of Turnicze, the latter of which shows an episode in the legend of St. Ladislaus. The fresco to be found at the Cathedral of Szepesváralja displays an ecclesiastical subject with a political background.

Of the monuments and public buildings of the fifteenth century, the Cathedral of Kassa and a few other village churches in Upper Hungary, as well as the beautiful Town Hall of Bártfa, in the same district, are the only relics of that period.

Among other architectural relics of the Middle Ages no doubt the most perfect specimen of the kind preserved is that of the Castle of Vajda-Hunyad, formerly the city and stronghold of that immortal Hungarian hero, Hunyadi-János (father of King Matthias).

A replica in plaster of this building was exhibited at the Hungarian Millennial Exhibition, and also at the Paris Exhibition, where it commanded the general admiration of all, and was considered as the finest specimen of architecture preserved from mediæval times.

The Hungarian Government have lately raised a beautiful palace for the Royal Agricultural Museum in the town park of Buda-Pesth, after the pattern of this castle.

Among the artists belonging to the Middle Ages, hardly any names of importance have been handed down to us, but Hungary is proud to be able to claim the famous Albert Dürer as one of her sons, for although Dürer was born at Nuremberg he was of Hungarian parentage. His father, whose name was Ajtós, was born in the town of Cyula, in the county of Békes, and resided there until he migrated to Germany, where he took the name of Dürer, the German for the Hungarian name of Ajtós.

For over a century and a half, while the Turks were either knocking at the gates of Hungary or had practically become its masters, the Hungarians had no time to devote to art, for, to use the words of a famous poet, "They had to guard the country with their sword in one hand and to plough the land with the other."

With the final expulsion of the Turks (1699) the innate love of art made itself again potent, and two artists of great fame appeared on the scene in the persons of John Kupeczky (1671-1740) and Adam Mányoky (1673-1757), both of whom established a world-wide reputation, John Kupeczky having lived for many years in Rome and finally settled in Nuremberg, which at the time was the city of art and culture; whilst Adam Mányoky, who lived for many years and studied art in Hanover, Paris, and Holland, became the favorite painter of the King of Poland, Frederic Augustus II., also Elector of Saxony.

Both these artists cultivated the art of portrait painting, and followed the style and tendency of the Rembrandt and Vandyck schools, of which they were most able exponents. It may be of interest to know that both of these painters are represented in the gallery of the Marquis of Bath, and likewise in the leading collections of Europe.

The frescos of the Buda-Pesth University Church date from the eighteenth century, and although they have been hardly dealt with by time, nevertheless they may be regarded as fine specimens of the Rococo style.

During the reign of the famous Queen Maria Theresa (1740-1780), art and science received great support and encouragement, and this was partly the case during the rule of her son, Joseph II. (1780-1790), but unfortunately the kings that followed them have shown no desire, nor did they have any inclination, to encourage Hungarian art, science and literature; besides, their time had been otherwise taken up with continual wars, which was especially the case with Francis I. (1792-1835).

Under such conditions art again lay dormant, and the few who made it their profession could barely make a living, and some of the most celebrated portrait painters had to take to painting sign-boards, or to adorn with pictures the household furniture of the peasants, while the sculptors had to work in the potteries. In the Koronaherczeg-street of Buda-Pesth there is a sign-board which was painted by one of the most famous Hungarian artists, Barabás.

Towards the middle of the last century that great Hungarian patriot, Count Stephen Széchényi, to whom Hungary owes so much for its resuscitation in many directions, had also seriously occupied himself with the promotion of the arts, and his activity in this direction was followed up with the greatest zeal and energy by the late Minister of Education, H. Auguste Trefort. With a view of attaining his object, the late lamented Minister

[1]Extract from a paper by Mr. Louis Felberman, read before the Society of Arts and published in the "Journal" of the Society.

founded an Art Union, which had for its object the exhibition from time to time of pictures presented by Hungarian and foreign artists, which were disposed of by means of a lottery among its members.

The stormy period of 1848 and the sad days which followed put an end again for some time to the development of Hungary in general, and with it its arts and industries suffered; as soon, however, as peace was restored in the country and, by the Treaty of 1866, Hungary had a free hand in the management of its affairs, the people settled down to work, and art and science commenced to prosper once more.

In the year 1870 the first School of Fine Arts was opened under the direction of the famous painter, Gustavus Keleti, and later the School of Painting began its activity under that illustrious painter, Julius Benczur.

The Government took the matter seriously in hand. A Fine Art society and other institutions were formed under their auspices, scholarships were granted to deserving art students, and in many cases the entire expense of their education was defrayed both at home and abroad by the Government. The result of this was that the country became possessed of some of the foremost artists in Europe, men whose names will be handed down to posterity.

In the plastic art and sculpture, Hungary can claim to rank among the first countries in Europe; indeed, few nations can boast of so many famous sculptors as Hungary.

Hungary boasts of a great number of highly-talented architects, and it is owing to them that the public buildings of the city of Buda-Pesth are considered among the finest in Europe.

Nicholas Ybl was the first to distinguish himself with his beautiful designs of the Ropal Opera-house, the Customs-house, and the Bazaar of the fortress of Buda. Nothing can excel in style and beauty the Houses of Parliament which were recently erected along the Danube quay, at a cost of nearly £3,000,000, after the designs of the architect, Emerich Steindel. The beautiful Gothic structure is a real triumph of art and it is a worthy rival of the Palace of Westminster, which inspired the great artist.

The imposing new buildings of the Palace of Justice, close by, which were recently erected at enormous expense after the designs of Alois Hauszmann; likewise the new Palace of Buda, commenced by Ybl, and completed by Hauszmann, may be regarded as the pride of Hungarian architecture.

Altogether Buda-Pesth may be termed a city of art. There are two beautiful palaces of fine arts and a National picture-gallery filled with the most precious treasures that money could purchase at home and abroad.

In addition to this there are numerous private collections both in Buda-Pesth and in the country. There is a museum of Fine Arts which will bear comparison with any of its kind, and everything is done both by the King and the Government to encourage native artists and to induce them to live at home, for the good of the country. It is fortunate that the country possesses such a gifted and esteemed nobleman as Count Albert Apponyi as its Minister of Arts and Culture. Doubtless under his able direction the arts of the country will flourish more than ever.

The Value of English to the Technical Man[1]

TECHNICAL men are peculiarly prone to offend in the use of their mother tongue, because they have not, as a rule, read deeply in classical literature or been instructed thoroughly in the construction of the language. Their higher education is generally almost entirely technical. Most of the engineering schools now require for matriculation substantially the same subjects as the colleges do, but some of the best still admit students with little more than a grammar-school education, supplemented by the rudiments of the natural sciences and elementary mathematics. Cultural subjects are never required to any great extent, and they cannot be taught in the course. The curriculum is already well filled with scientific, mathematical and technical subjects, and there is not room for a deep study of literature and the languages. The technical man who has a thorough knowledge of English has had the wisdom and patience to supplement his technical education by an arts course, has read widely of classic literature, or possesses the rare gift of language. Long-continued and intimate association with those who employ excellent English will insure reasonably good usage, in fact such association is almost essential, no matter what the education may be; but the knowledge of the language so acquired generally breaks down when it is applied to technical matters in which extreme accuracy is a requisite and in which the terms differ much from those used in ordinary conversation. There is no royal road to a knowledge of technical English.

Some of our better universities are now offering a six years' course which combines the usual arts and technical courses, each of which ordinarily occupies four years, but which have many subjects in common. This is a decided step in the right direction, for technical men generally are coming into a more complete realization of their deficiencies and are insisting that young technists be more liberally educated. The professional man does not always remain a technist, in fact he frequently becomes a man of affairs as well, where a liberal education is even more essential than in his purely technical work.

Before passing to a consideration of the specific advantages enjoyed by the technical man who uses good English, let us glance at some of the grosser faults of which so many are guilty, for there is no better way to attain a comprehension of the good than by contrasting it with the bad. It has been well said that it is no virtue to speak good English, but that it is a disgrace to use bad English. The upright man does not feel the burden of the law, but to the criminal it is oppressive.

You will say that it is absurd to state that men who have graduated from any college cannot spell correctly, but many of them cannot. S-e-d, said, p-e-a-r, pier are extreme but true examples. It is very common to find misspelled words in letters written by young engineers. They consider such errors of no material consequence, because they are not technical errors. The mind has been so fixed upon the scientific work during the course of study, and while the early experience is being acquired, that such matters as language and culture seem to be of little importance. But the recipient of the letter generally takes a different view of the matter, for he justly considers the writer something of an ignoramus.

Errors of orthography and orthoepy are both due to unpardonable carelessness and ignorance, for any one can learn to spell and to pronounce correctly, and no man should be given a degree or a diploma by any institution of learning unless he does so habitually.

Grossly bad grammar is also very common. It generally arises from carelessness in ordering the thought and speech rather than from lack of knowledge of correct usage, but it is frequently attributed to ignorance, and certainly the penalty is not too severe. In many instances, however, ignorance is the true cause of the error. The study of grammar commonly ceases when the student leaves the graded schools. Thereafter, he assumes that his knowledge of the subject is full and complete and that he need give it no further attention, notwithstanding the fact that his capacity for thought and the need of means for its expression continue to increase. His vocabulary grows; but his knowledge of the fundamental principles which govern its use not only does not expand as his needs require, but it is allowed to become uncertain and to diminish through lack of exercise. When the matter is thought of at all, it is assumed that in some vague, uncertain way habit will serve, instead of knowledge and understanding. The grammar is put away, like other childish things.

Some prominent writers state that the English language is without grammar because inflection is absent and the position of the words in respect to each other is depended upon to make their meaning clear, but this is an extreme view. It is true that most of our grammars only catalogue the rules without explaining their origin and history, but the rules are none the less existent and binding upon us. They were developed by the English people in the course of the evolution of the language, not by the grammarians who formulated them; and sentences which are not constructed in accord with them will fail in their purpose. The lack of inflection, however, affords a degree of flexibility not attained in any other language. Because the laws of English are less rigid than those of other tongues we are not only none the less obliged to observe them, but we are also obliged to supplement them by a careful observance of precedent and reason and to study the usage of those who serve as examples.

[1]Extract from an address by Mr. John Lyle Harrington to the Technological Society of Kansas City.

COMMUNICATION

"Origination of the Steel Skeleton"

Washington, D. C.,
July 22, 1907.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs:—Judging by the number of letters of inquiry and of criticism received anent my communication of June 27, appearing in your issue of July 13, concerning the "beginnings" of steel frame construction, I should imagine that something was lacking in that letter to make it quite clear, or that the title you gave it misled some of the hypercritically inclined. I did not, and do not, claim the invention of the steel frame. That letter was written to show the folly of any such claim by any one individual for himself, or some one he admired and desired should be honored.

My belief is that no one man originated—"invented"—that construction, as the term invention is generally understood. It was rather a most natural step in the regular and ordinary evolution of construction, and that was suggested by the conditions and demands of the time. Probably a hundred men thought of the same way of meeting those conditions. To engineers and architects of extensive experience it must have been a logical and simple development—a solution of the problem that seemed quite natural. It never occurred to me, a lad just out of his 'teens at the time, that there was anything marvelous or original about the idea, and my intention or purpose in writing that much-criticised letter was merely to discredit, to contradict and to stamp as ridiculous and an impertinent assumption the claims of at least one alleged inventor to having given birth to this most wondrous scheme.

Very truly yours,
F. W. FITZPATRICK.

[We ourselves understood Mr. Fitzpatrick's former letter just as he now explains it, except that we supposed he meant in part to suggest that something in the way of credit was due to Mr. Strom. —EDS. AM. ARCH.]

ILLUSTRATIONS

HOUSE AND STABLE OF HARRY RUBENS, ESQ., GLENCOE, ILL. MR. GEORGE W. MAHER, ARCHITECT, CHICAGO, ILL.: FIVE PLATES.

HOUSE OF MR. SPENCER, WASHINGTON TERRACE, ST. LOUIS, MO. MESSRS. BARNETT, HAYNES & BARNETT, ARCHITECTS, ST. LOUIS, MO.

GOLDSMITHS' AND SILVERSMITHS' BUILDING, MAIDEN LANE, NEW YORK, N. Y. MESSRS. CLINTON & RUSSELL, ARCHITECTS, NEW YORK, N. Y.

HOUSE OF JULIAN KENNEDY, ESQ., PITTSBURGH, PA. MESSRS. GEORGE S. ORTH & BROTHERS, ARCHITECTS, PITTSBURGH, PA.

Additional Illustrations in the International Edition.

REAR ENTRANCE TO STABLE-YARD OF HARRY RUBENS, ESQ., CLENCOE, ILL.

ENTRANCE FEATURE: HOUSE OF MR. SPENCER, ST. LOUIS, MO.

NOTES AND CLIPPINGS

ONE OF DISRAELI'S GIBES.—Disraeli said that our fine London squares resembled "a large family of dull children, with Portman Square and Portland Place for their respectable parents." Surely this is very unjust; it may be doubted if any city can show such a succession of stately gardens and noble trees.—*Builders' Journal.*

THE PATRIZIENHAUS ZUM RITTER AT HEIDELBERG.—From Heidelberg comes information that the first stage in the restoration of the "Patrizienhaus zum Ritter" has been completed in a manner to evoke most favorable commendation. State, city and owner share in the cost of restoration of this remarkable example of German Renaissance architecture. The actual work was intrusted to Herr Linde, a royal architect, who also, as a State charge, has made all investigations and arranged for the general reconstruction. The erection plans are carried out in natural size, thus rendering easily possible any subsequent renewals of the façade. It may be recalled that some three years ago an American had the intention of purchasing from its private owner the original building as one of the most beautiful architectural examples of the German Renaissance, and, after carefully taking it down, re-erecting it in some American city as an art memorial. No doubt it was this project that stimulated the State and city to undertake, with the owner, its restoration. Every one familiar with Heidelberg, and especially every Heidelberg University man, will be interested in learning of the outcome.—*New York Herald.*

EXPANSION AND CONTRACTION IN CONCRETE STRUCTURES.—A paper by Mr. A. C. Lewerenz, M. Am. Soc. C.E., containing some notes on concrete and reinforced-concrete retaining-walls at the United States Navy Yard, Puget Sound, is deserving of study, as the subject of expansion joints in structures of the kind has never been exhaustively investigated, and many practical engineers are not entirely convinced as to the efficacy of such joints. In the case of a solid concrete wall built some four years ago, Mr. Lewerenz states that the expansion joints provided all appear to be active, opening as much as 3-16 inch. Across the top of the wall many fine cracks, sufficiently wide to admit the blade of a pocket-knife, and 2 inches to 3 inches deep, have appeared at intervals of about 6 feet apart. It is interesting to compare these results with the record concerning a reinforced-concrete wall with a thin face slab, and buttresses at intervals. This wall, over 1,200 feet long, was built last summer without expansion joints, as it was considered that the reinforcement would prevent serious cracking of the concrete. The anticipation has been fulfilled, for careful examination shows that the only effect of exposure to the sun at low tide during the day, and to the cold water at high tide during the night, has been the formation of very fine surface cracks across the top and down the face of the wall at intervals of about 75 feet apart. From the foregoing and other examples, Mr. Lewerenz concludes that the use of properly-designed expansion joints, or of sufficient reinforcement, will prevent the development of cracks through concrete structures, but that neither method of treatment will obviate fine surface cracks in situations where sudden and extreme changes of temperature are experienced.—*The Builder.*

YSLETA CHURCH BURNS.—The oldest church edifice in the United States was destroyed by fire the other day. The ruins of adobe and stone are to be removed, under the direction of the Catholic Church authorities, and a thorough search made for hidden treasure, which, according to legends that have been handed down for generations, lies buried beneath the floor of the building. The records go to prove that Ysleta, Tex., is older than St. Augustine, Fla. In the records of the great cathedral of Madrid, Spain, is found the report of Marcus de Niza, a French monk, who says that he left the City of Mexico and made his way north, finally crossing the stream that is now known as the Rio Grande. He says that he followed the road that he left for his mule to take. Part of this manuscript is written with the blood of a deer for ink, and his own forefinger nail for a pen. He says that in 1537, across the Rio Grande, he found the village known as Ysleta, occupied by the Pueblo Indians, whose traditions all point to their having been of the ancient Aztec race, or to a people of even more remote origin. Franciscan missionaries arrived at Ysleta four or five years later, and the mission church which was destroyed by fire a few days ago was erected. It was completed about 1550. In many respects it was the most unique mission building in the Southwest. Owing to the fact that it was remotely situated it was seldom visited by tourists, and little has ever been written about it. It was a very large structure, and was built with the idea of serving as a fortress in case of attack by Indians, as well as for worshipping purposes. The walls were 4 feet and 6 inches thick. It was the boast of the worshippers that the candles which burned at its altar had shed their light continuously for more than 350 years. It was one of these candles that caused the destruction of the church. A piece of tapestry was wafted against the blaze by the wind and in an instant the inflammable material of the altar was afire. It was as dry as tinder and the flames quickly spread to the other woodwork of the edifice. The interior was soon a roaring furnace. The town has no means of fighting fires and the people were forced to stand idly by and watch the building go to its doom. There is great sorrow among the people on account of the destruction of the historic edifice.—*Boston Transcript.*

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SOCIETIES, PERSONAL MENTION, ETC.

THE unscientific character of the accepted method of computing an architect's commission, to which we referred last week, becomes very clear when it is shown that for doing absolutely nothing an architect may win or lose—the gambling terms are the right ones to use—considerable sums. Suppose a case where an insurance company, accustomed to build in a lavish manner and never condescending to cut down its outlays for the mere sake of saving money, has decided to build an immense fireproof storage warehouse, fifteen stories high and covering an entire New York block; suppose that, up to the last moment, the architect and the building-committee have assumed that the exterior was to be covered with "face bricks," but that, just before the specifications are given out to the contractors for figuring, the leading spirit of the committee should say: "No, I've been looking about town, and I don't like face-brick buildings, with their even tone and precise edges: we will use the common stock brick." The decision makes a saving of tens of thousands of dollars to the insurance company—which didn't at all care to make the saving—and it also causes a loss of thousands from the architect's commission. But he must accept the loss, just as he would have accepted the gain under the first conditions, and yet no one can show that in either one case or in the other he did anything at all which deserved either reward or punishment.

PERHAPS there are other callings where compensation is awarded to efforts that have no reality. The nearest approximation we can bring to mind is the case where a tailor—assuming that tailors figure their profits at an even rate in all cases—finds the actual sum of his profits affected by the choice his customer makes between one piece of cloth and another. But ought not architects to feel that the reward for their effort should be figured in another, a more "professional" way than that honored by the worthy handlers of the shears and goose? The attitude of the man-milliner is far more dignified; he charges practically as much for a "creation" in a print-stuff as for one based on crêpe de chine, and it is precisely because it is a "creation" that he makes his charge, and that charge is not the same to-day that it was yesterday; it is not the same for Mme. B. as for Mme. X.; the man-milliner on the Rue de la Paix charges more than he on the Boulevard des Italiens. The man-milliner bases his charges—as all painters do, as all artists should—on, to use a railroad term, "what the traffic will bear," and the determining factors are his own reputation as artist and the financial ability of his customers.

IT is not at all curious that some architects to-day have a phenomenal amount of work and an agreeably large income from it. Why should they not have, when the entire profession joins in helping them to it? Unquestionably they have talent and ability, but so have many other architects who have little business and less income. However foolish the architectural profession may be, the American man of affairs is not a fool, and when he can readily hire the best-known talent and experience there is at the rate of five per cent., why should he ever think of employing any other? What inducement is there that would lead him to entrust his work to unknown men and inexperienced hands? What is called "rate-cutting"—the action that causes so much rabid talk at the sessions of the architectural societies—is natural, is inevitable under the even five-per-cent. rule of current practice, and in very many cases it is not only defensible but even may be commendable—where starvation is the alternative. Properly considered, rate-cutting is not a wrong done to the profession by the rate-cutters, but rather the external evidence of a wrong done the less able, the young and the inexperienced through the cowardice of the best-known architects who do not dare to assert confidence in their own reputations and charge "as much as the traffic will bear."

MORE than any other class that can be named, more even than writers, since man may elect not to read while he must see, architects have the opportunity to excite pleasure in or inflict disgust on their fellow-men through the exercise of their creative faculties, and if architects gave more heed to this fact, possibly the architectural aspects of our cities and countryside might benefit. Conscientious and progressive architects, in their later years, must look with a good deal of regret at the enduring expression of their youthful efforts, but we fancy that when the late William H. Russell, who died

abroad a fortnight ago, reviewed the work he had accomplished he found pleasure in perceiving that so much of it was of a nature to give more pleasure than pain to his fellow-citizens. In their class, the buildings designed in late years by the firm of Clinton & Russell, the Hotel Astor, the Seventy-first Regiment Armory, the immense Hudson Terminal Building, the Atlantic Mutual Building and the great apartment-house on upper Broadway, are among the notable buildings of New York City, competently designed, although not exactly manifesting genius on the part of the designer, and admirably planned and built. Mr. Russell, who was born in 1856 and was a graduate of Columbia College, received his early architectural training in the office of his great-uncle, the late James Renwick, eventually becoming a partner in the firm of Renwick, Aspinwall & Russell. In 1894 he was taken into partnership by Mr. Charles W. Clinton, who for many years had enjoyed the friendship and confidence of an important group of owners of real estate in the commercial districts of the city. From that time forward his career was clear, though it demanded the mental and physical effort that often wears out too soon the man of artistic temperament.

IN view of the doubts we expressed a short time since as to the propriety and moral righteousness of the modern movement toward cathedral-building in this country, it is agreeable to learn that others entertain the same feeling, others who are just now in the position to give their feelings practical effect. It seems that there is division of opinion in the congregation or amongst the trustees of St. Thomas's Church in New York, one of the parties being in favor of spending at least one million dollars on an architecturally perfect church, erected on a new and sufficiently large site, while the other holds that it would be more becoming to expend but half as much money on rebuilding, in order that the ability of the parish to continue and enlarge the charitable undertakings for which it has always been famous might not be impaired. And yet, in the case of St. Thomas's, we would willingly see the larger sum expended, on the principle that it is not repulsive to see an always well-dressed man clad with even more than accustomed elegance, while the fine raiment of the *nouveau riche* would but excite scoffings. As long-time occupants of the most beautiful church, perhaps, in New York, the congregation would find themselves none too much at ease in the most expensive structure they could afford. Besides this, we would much like to see the church that Messrs. Cram, Goodhue & Ferguson would produce when they had one million dollars at command.

MOVED by interest in the subject, and influenced by the remarkably instructive report of the Boston Society of Architects as to ways and means of improving and embellishing the Metropolitan District of Boston, the Massachusetts Legislature, at its last session, enacted a law authorizing the appointment of a Metropolitan Improvement Commission who should study the matter further and report with recommendations. Governor Guild has just named the gentlemen who are to serve on this Commission, and his selections are excellent. The two men whose opinions will probably have the most weight with the Legislature and with the public are Messrs. Robert S. Peabody and Desmond FitzGerald, whose standing as, respectively, architect and engineer, is well known to all our readers. Mr. Henry B. Day, a banker, can advise competently upon financial matters, which are largely involved. Mr. Thomas J. Gargan, long a member of the Rapid Transit Commission, is already familiar with many of the conditions of the problem, while the chairman, Mr. Benjamin N. Johnson, is a lawyer of standing. It is interesting to find the Governor of Massachusetts giving evidence that he appreciates the value of years and experience, and does not feel that everything must be entrusted to energetic youth, untested and inexperienced.

SIDE issues and by-products are very curious, and pecuniary returns are in these days of the higher chemistry obtained from the most unexpected sources; but there surely was never a more fantastic tale developed than one that has its source in Clairemont, Tex., where there is a syndicate that has control of 145,000 acres of land on which there is "a great deposit of cement clay," which is to be converted into cement at the rate, at first, of twenty-five tons a day. At the head of the syndicate is a certain H. H. Bourne, said to be now upwards of ninety years of age, who proposes to live at least three hundred years longer by continuing his peculiar diet. It is said that Mr. Bourne "uses freely" a "mineral clay" which is found on his ranch, and though he does not insist that the other members of the syndicate, or its customers, shall adopt his diet, he is satisfied that the food is the same that was used by Methuselah, a number of years ago, with such beneficial effect. Clay-eating, which is practised in different parts of the Southern States and in Styria, has not usually conduced to longevity, but if Mr. Bourne has discovered a superior grade of the slippery stuff, and can guarantee that each barrel of cement turned out by the syndicate contains a package of the life-giving "mineral-clay," he should be able to drive all other cement-makers out of the market.

A NEW French weekly journal, *Le Connoisseur*, which devotes itself largely to the discovering and unveiling of forgeries in the field of art, tells one story which contains an amusing echo of a bit of slang now current in this country. A recent offering at public sale by M. Sedelmeyer of certain paintings was under consideration, and amongst them was a group of some thirty Dutch fruit-and-flower pieces of stated dates and schools, but by different artists. The critical observer chanced to notice a singular similarity in a large proportion of the canvases: prominent in the foreground of each was a lemon. Thinking this odd, the critic hastened to the Louvre, and there carefully examined all the many Dutch paintings, and was not surprised to find that in only three cases was a lemon dished up; he was, however, greatly amused to find that one of the three lemon-bearing canvases had been presented to the museum by M. Sedelmeyer! The inference plainly suggested is that the adept employed by M. Sedelmeyer to produce fruit-pieces in the style of different old masters had had furnished to him as models a certain amount of natural fruits, and among them the tell-tale lemon, which appeared on all the canvases until it became withered and changed its tone.

Reinforced Concrete Building Construction[1]—I

MR. CHESTER J. HOGUE.—When the writer was asked to take part in this meeting his first thought was that if he could say something to stir up the concrete experts he might himself take a very brief part and then turn the meeting to his own advantage, getting more information than he would give.

Reinforced concrete, of all methods of building construction, seems to be attracting the most attention just now, and the design of reinforced concrete at this time certainly furnishes the best field for discussion of any branch of structural engineering.

You are all interested in the developments of engineering knowledge, but you are not all in the fix of some of us who, regardless of what we really know or of what really is known of the design of reinforced concrete, have to assert for the peace of mind of the owners and their confidence in their own buildings that we have completely mastered the science. Amongst ourselves, however, we may speak a little more freely, and in a short description of a typical concrete factory-building the writer will mention briefly the principal points which must be decided to determine the design, and hopes you will see fit to discuss them very freely for the benefit of us all.

Reinforced-concrete factory construction, from its ease and economy of execution, rapidity of erection and "everything-proofness," seems to be the most distinctive development of this form of construction. On the side of economy the company with which the writer is connected has this year, by careful laying out of the work and study of the wood forms, proved beyond a doubt that a building of this construction can be built at the same cost as one with brick outside walls and wood-framed mill-construction interior, and sometimes for even less, if the building is high and the loads are great. In general, economy in design lies in using slabs of 8, 10 or 12 feet span supported by lines of beams in one direction only, these beams resting directly on columns, with no girders; but when a wider spacing of columns is required economy is gained by using a slab of minimum thickness, say three inches if the finished floor is to be of wood on top of the concrete, or four inches if the finished floor is to be of granolithic laid at the same time as and as part of the floor, spacing the beams as closely together as this slab will require and framing the beams into the girders at the third or quarter points. In construction the great point in saving of cost is in uniformity of detail and in making the wood forms carefully at first in units and then using the units over and over again as many times as possible. As for speed, we can safely guarantee to complete a building at from eight to ten days a story, and we have this year begun and completed buildings while others of equal size were waiting for their steel frames to be fabricated and erected. Everything-proof, it is shown beyond doubt that in recent fires and earthquakes buildings constructed wholly or in part of reinforced concrete gave the best account of themselves; if properly built, there is nothing to rot or rust; without hollow spaces, there are no retreats for dust, dirt or vermin.

One point, however, shown by a number of recent failures, sounds a note of warning quite independently of the feeling of those who have put years of study into this work, that they alone should be trusted to do it—that unless engineers and architects are themselves experts in reinforced-concrete design and construction and wish to give their work very careful supervision, they should be extremely careful that the men into whose hands they intrust the erection of their buildings should know how to design them, how to build them and should care to do them right; and both they and the owners should realize that first cost does not always mean ultimate economy.

There are two types of reinforced-concrete factory construction, the one with concrete outside bearing-walls, with few openings; the other the skeleton type of construction, the walls being simply filling in panels built afterwards. It is the latter type in which the writer is particularly interested because it is the easier to build and the more economical, and he would call your attention to the following distinctive points. The column and pilaster footings only need go down to a solid bearing, unless an excavated basement is required. Where there is a basement, light walls reinforced horizontally from column to column or vertically from the basement floor to the first floor will retain the earth, the reactions being taken by the colmns or by the basement and first floor, while the walls may be reinforced to carry themselves from footing to footing, requiring no foundations of their own. Where there is no basement the outside walls need only go far enough down to prevent frost working in under them, with possibly a shallow trench filled with cinders or gravel underneath, and can be reinforced to carry themselves from pier to pier and to support the walls above. By building the footings first and carefully filling, settling and leveling the earth and laying the floor on the ground, the shores to support the false-work can be cut of even lengths, and there will be a good level surface to shore from. Columns and floors are built first as in skeleton steel construction and the outside panel walls are self-supporting, but not weight-bearing, and are built in between the pilasters entirely independently of the floors at a later time, furnishing a convenient method of keeping the concrete gang busy while the concrete floors are setting or the wood forms are being shifted from floor to floor, or when the weather is too wet or too cold to safely permit the laying of the more important work of the floor construction.

Going back now to the question of design, the following list notes a number of important points which must be taken up for decision in designing any reinforced-concrete structure:

Footings.
1. Distribution of stresses over tension flange,
2. Proportion of diameter of rod to side of footing.
3. Shear.

Columns.
1. Rich concrete.
2. Longitudinal rods and spacing of ties.
3. Hooped columns.

Beams.
1. Economical proportion of depth to length of span.
2. Spacing of rods in stem.
3. Upper rods bent up where.
4. Length beyond edge of bearing.
5. Allowable width of and distribution of stresses over compression flange.
6. Proportion of thickness of slab to width of stem.
7. Allowable unit shear in concrete when shear is taken by steel in tension.
8. Can diagonally-bent rods, vertical stirrups and plain concrete in shear be utilized together at their working strengths to resist shear, or what combinations can be made?
9. Maximum spacing of shear stirrups.
10. Are round, square or flat stirrups best?
11. Proportion of size of stirrups to depth of beams.
12. Continuous beams.

It is on these points that the writer particularly wishes to start a discussion, and will take them up briefly, as follows:

Footings. (1) The footings are reinforced for tension with rods laid in two or more directions as close to the bottom of the footing as protection from rust, etc., will allow. There is no question but that the rods directly under the pier carry their full portion of the load, although the requisite number of rods to properly reinforce the footing may be spread over an area somewhat greater than the width of the pier with a fairly even distribution of stresses over the entire number of rods, but it would seem that as the spread of the rods increases in proportion to the width of the pier above, the stress in the outer rods must decrease, and the distance of the outer rods from the edge of the pier must be limited in some way, possibly by the line of shear of plain concrete, though probably it could be somewhat greater. It seems, though, that this is an important point and that for safe practice some limit should be determined which will avoid over-stressing the rods under the center.

(2) A point of importance in the design of a footing is the proportion of the diameter of the rod used to the length of the rod itself, to insure safe anchorage. In a footing rod the maximum tension is at the center, decreasing toward each end, and it may be assumed that the length of rod on one side of the center serves to anchor that part on the other, and it seems to the writer that there should be some definite limit for the proportion of the diameter of the rod to its length, depending on the allowable adhesive stress of steel and concrete. If thirty-six diameters were assumed as giving a safe anchorage to a rod, its

[1]An informal discussion before the Boston Society of Civil Engineers at its meetings held September 19 and October 5, 1906, published in the "Journal" of the Association of Engineering Societies for June, 1907.

diameter should not be greater than one seventy-second of the length of the rod, or practically the length of the side of the footing.

(3) Shear in a cantilever beam differs from that in a beam supported at the ends in that in the cantilever beam, at the point of maximum tension in the rods, there is the maximum increase in stress on the rods and the maximum shear, while in the beam supported at the ends the point of maximum tension in the rods is the point of no increase in stress on the rods and the point of zero shear; that means that in the beams supported at the ends the maximum increase in the stress on the rods takes place at the end where there is no anchorage beyond, while in the cantilever beam the minimum increase is towards the end, and so the adhesive stress on the rod from shear decreases. In a beam supported at the ends it seems to be the adhesive stress on the rods near the end which causes the beam to fail, when there is no steel shear reinforcement, at what seems to be a low-unit shear on the concrete, and it seems for that reason that it is proper to use a higher shearing value on a cantilever beam than in a beam supported at the ends, even though there be no steel shear reinforcement.

Columns. (1) In columns there are three ways of getting the requisite strength. The one which the writer's company most commonly uses—because it has so far seemed to be the handiest and cheapest—is that of a rich mix of concrete. But that is inconvenient for various reasons, as, for instance, if you carry the rich mix up to the under side of the beams and then carry the mixture of the floor and beams over the column, there is a leaner and weaker concrete from the bottom of the beam to the top of the floor slab, and it would be difficult to carry the column mixture to the top of the slab and get the beam and slab concrete laid before the column concrete had begun to set, thus not giving a good bond between the two mixtures, while by building brackets from the column to the beam or by building a capital around the top of the column the increase in the cost of the centering would make it almost as cheap to build a large column all the way down. Then there is the further point that, in using two or three mixes of concrete in the same building, you can never be sure of getting the right mix in the right place. It is so difficult to get work done as you want it when you are on the ground, even, that it would seem to be useless to expect it to be always done right when you are away; and you cannot be there all the time and ought not, therefore, to take any more chances than you can possibly help, but try to design everything in the simplest possible way. Then again, even if you use a pretty good unit stress on rich concrete, you will find that when you get into a very tall building, or one with very heavy loads on the floors, the size is larger than the owner will ordinarily want to allow.

(2) The next way, perhaps, of getting strength is by using compression-rods. Here again are difficulties. The ends of the rods where they bear one on the other at the floor levels should have faced ends and be put into some sort of a socket or tied together in some way, or else have sufficient lap to distribute the stresses from the upper rod to the lower through adhesion to the concrete. Longitudinal rods, if you wish to have them take the same deformation as the concrete, must be stressed in proportion to the moduli of elasticity of the two materials, and that means that the steel can be used up to hardly half of its ordinary safe working strength, which is far from economical. Then again, if the distribution of stresses at the floor levels is taken care of by faced ends or by lapping enough to transfer the stresses by adhesion, there will still be a good deal higher stresses on the column at the footing than should be allowed, unless the rods are to rest on bearing plates. When plain rods are not large enough to give the additional strength required, or rods larger than it would be practical to use are necessary, structural shapes must be resorted to, but structural shapes are expensive and mean delay, they being the slow things to get out of the shops, and they are hard to frame to with concrete, as it is difficult to secure proper bearings for the ends of the beams and girders and to carry the tension rods of the beams through the column in order to get continuous ties through the building and take care of the stresses over the supports.

(3) It seems that the solution of the problem might lie in a hooped column. The writer has eagerly followed developments in that line, although they do not seem to have been carried far enough in the way of tests to know what will be the final results; that is, to know to what extent hooping may be carried and whether, as the result of repeated loadings and unloadings, the concrete will disintegrate and run out through the spaces between the hoops. In New York, hooped columns have been built where the concrete jackets were cast first and hooped columns built inside of them. It seems to the writer that there is a good point here and that the jackets might be reinforced to a certain extent both horizontally and vertically so that it would not matter whether the concrete inside the hooping disintegrated or not, while the jackets would act as fireproofing for the hooping. In connection with hooped columns there comes up the further questions as to what should be the maximum pitch of the hooping and whether it can be carried to an indefinite extent up to a complete inclosing steel shell, or whether there is a limit to its efficiency. In any kind of a concrete column, except one in which structural steel shapes carry practically all of the load, longitudinal rods should be put in to take care of flexure from eccentric loads and that sort of thing, and these longitudinal rods should be bound around horizontally at certain intervals by steel bands of some sort; this is especially important where the rods take part of the compression stresses, in order that they may not buckle and break out of the concrete. There are two limits which the writer does not ordinarily exceed in spacing these hoops, one perhaps a little less than the diameter of the column and the other not more than eighteen to twenty times the diameter of the rods.

Beams. (1) The first point to be determined in designing a beam is the depth, and it would seem to the writer that from one-tenth to one-fourteenth of the length of the span is a good proportion; that is, a depth in inches equal to the span in feet is usually satisfactory, both for stiffness and economy.

(2) The spacing of the rods in the stem is important, for the shear on the plane above the rods, for adhesion of the concrete to the rod, for providing sufficient concrete around the rods to thoroughly inclose them, for convenience in placing the concrete between the rods, and for the security of having the rods well protected from fire. If the rods are spaced by proportioning the adhesion of the rods to the shear on the plane above, the other conditions will probably be satisfied. A spacing of two and a half to three diameters is that most commonly used for rods in the same horizontal row, while if there are two rows, one above the other, the vertical spacing is usually about two diameters, although in a number of systems the two or sometimes three rows of rods are placed in direct contact, although this does not seem to the writer to be good or safe practice. If there are two rows of rods and the upper rods are bent up at their third or quarter points, the rods in both rows may probably be spaced as if there were only one row, as the upper rods will act as the tension rods of a belly-rod truss, carrying their stresses directly to the top of the beam; but if there are two rows of straight rods, it seems to the writer that the shear must cross the plane just above the rods and be distributed into the rods by adhesion of the concrete and steel and that the spacing should be twice that allowed above unless there are rigidly attached shear members to distribute the increase of stress in the rods into the concrete. For fireproofing, the rods should be spaced not less than two diameters up from the bottom and in from the side of the beam.

(3) When there are two rows of rods in a beam with the load uniformly distributed, the upper ones are usually bent up at their third to quarter point or sometimes even closer to the bearing. It seems to the writer that there are advantages in favor of the quarter point, as then the rods are not bent up until there begins to be a material reduction in the bending-moment, while they will still carry a good deal of the vertical shear. In beams with concentrated loads the upper rods would probably be bent up after passing the last concentration unless this would require them to be bent at an angle greater than 45 degrees. In some systems the rods bend up at different points when they are no longer needed at the bottom for tension, thus taking out shear for practically the full length of the beam, but from the standpoint of comparative economy it would not seem advisable to have to bend rods in so many different shapes, to say nothing of the difficulty of getting the rods properly sorted and placed. The writer is convinced that it is better to keep designs as simple as possible, for both economy and convenience, in addition to being surer of having the work done properly in the field.

(4) Rods bent to the top of the beam are supposed to carry their full tension stresses quite to the edge of the bearing, and they must be anchored in some way at or beyond this point. This can be done with plates, nuts and threaded ends when there

is no beam beyond, but with an adjacent beam it is advisable to have a continuous tie over the support, so rods may be threaded and connected by means of turn-buckles or by lapping the rods from one beam by those of the other thirty to forty diameters, if the rods in both beams are of the same number and size, or by simply carrying the rods over each beam far enough beyond the edge of the bearing to anchor themselves in the concrete if they are not the same in both beams; in this case they should be lapped far enough in addition to their own anchorage to carry the strength of the bent-up rods of the lighter beam continuously over the supports. If the ends of the rods can be turned down, this bent end will safely enable the length of the anchorage to be reduced at least one-third. If a beam is not designed for full continuity it is still fixed at the ends to a certain extent by the nature and method of placing the material, and if there is no tensile reinforcement at the top of the beam over the support the deflection due to loading will probably cause a crack at the top near the bearing and this, being at the point of greatest cross shear, should by all means be prevented and sufficient reinforcement placed there to take care at least of the negative movement due to deflection, and it is a question whether a rod bent diagonally from the bottom of the beam to near the top at the edge of the bearing is sufficient or whether in this case cracks will still take place at some little distance out from the edge of the bearing, requiring tension rods near the top of the beam for some distance out from the edge of the bearing for their prevention.

(5) Leaving the rods now and coming to the compression flange of a T-section, the first point which must be determined is the distribution of the stresses above, vertically and horizontally. Of course, we must assume that the maximum compression stress is directly over the center of the stem, and it seems to the writer that there is no question but that the stresses diminish on each side of the center to limits fixed by some engineers at three to ten times the width of the stem and by others at from one-quarter to one-half of the length of the span, but it is a question whether this distribution is rectangular, parabolic or triangular in form. Vertically the stresses will increase from the neutral axis to the top of the slab, the stress diagram being an irregular curve which approaches a straight line at low stresses and a parabola as the stresses approach the ultimate strength of the concrete. It is necessary to assume the distribution in both directions and from this work out the allowable average stress over the compression flange, which will be a variable depending on the proportion of the thickness of the slab to the depth of the beam and the spacing of the beams in proportion to the length of the span.

(6) On the assumption that the compression stresses are distributed over a width of slab somewhat greater than the width of the stem in a T-section, there must be longitudinal shear on the vertical planes where the slab meets the concrete over the stem, and this must equal the shear on the horizontal plane between the slab and the stem, except for the amount of compression taken by the portion of the slab directly over the stem. The proportion of the total longitudinal shear which comes on these two vertical planes depends on the proportion of the width of the stem to the width of the slab assumed to be in compression, but as a general rule the stem should not be more than two and one-half to three times the depth of the slab; or perhaps it would be more proper to say that the thickness of the slab of a T-section at the planes over each side of the stem should not be less than from one-third to two-fifths of the width of the stem.

(7) In a concrete beam reinforced with straight rods at the bottom, the limit for shear is the vertical component of the diagonal tension stresses, and Professor Talbot has shown that in such a beam the vertical shear is equal to the diagonal tension, so that the safe vertical shear should not exceed, say, 50 pounds per square inch in good concrete. In a T-beam with steel shear reinforcement the conditions are somewhat different, and it seems to the writer that the vertical shearing limit should be the vertical component of the diagonal compression stresses, which would allow the vertical shear to be taken at about three times the value for a beam without shear reinforcement; but it must be remembered that this shearing value must be taken as the unit shear over an area equal to the width of the stem multiplied by the distance from the center of the compression stresses to the center of the tension stresses. It may yet be shown that such distribution of the shear reinforcement can be made that it will be a question of direct cross shear only, and it is pretty well established that the direct cross-shearing strength of concrete is somewhat more than one-half its direct bearing strength.

(8) It is a question in the mind of the writer whether, in a T-beam with both diagonally-bent tension rods and vertical shear rods, the concrete and both sets of rods may be assumed to carry shear at their working strength. It would seem perfectly proper to use the shearing strength of concrete in combination with that of diagonally-bent tension rods, or of diagonally-bent tension rods in combination with vertical or diagonal shear rods, but it seems to the writer that when vertical or diagonal shear rods are used, the shearing strength of a plain concrete beam should not be allowed in addition, because by the time the shear rods are stressed up to their working strength the concrete would be stressed beyond its tensile strength and the rods would be carrying all the stresses, whether they were assumed to or not.

Mr. E. P. Goodrich has recently made some tests of beams which he reinforced with vertical shear rods, but not sufficiently to carry all the shear. Tested to destruction, the vertical shear rods were pulled apart, but at a considerably higher load than they could be expected to carry by themselves, showing apparently that the concrete acted in combination with the steel even up to the ultimate strength of the steel, and it may be that by these and further tests the value of concrete and shear rods in combination may be established.

(9) Having established the size of the shear rods to be used, the spacing at the ends of the beam depends on the shear, but when the shear has so decreased that one shear rod is sufficient, they could theoretically be placed at panel lengths apart. Mr. Goodrich, however, has made tests of beams in which, with the shear rods at panel lengths apart, there were diagonal cracks in the concrete at the failure of the beam, while with sufficient shear reinforcement at half-panel lengths the beams failed by direct cross-shear. This would indicate that with shear rods at panel lengths apart the shearing strength would be the vertical component of the diagonal compression stresses, or about one-third of the direct compression strength, while with shear rods at half-panel lengths the limit would be direct cross-shear, or more than one-half the compression strength.

(10 and 11) There are advantages and disadvantages in different kinds of shear rods. Round and square rods will hold better by adhesion in the concrete; but to hold properly, the ratio of diameter to length would have to be sufficient to anchor the rod in the concrete above the neutral axis, while a flat bar could be more depended on for a direct bearing both top and bottom.

(12) The question of continuous beams is very interesting and one which is being given more and more consideration.

Having established the fact that some reinforcement over the supports is desirable to prevent cracking near the bearings, it becomes a question as to whether the negative moment due to deflection should be determined and reinforcement be placed to care for this, or whether you should go farther and design the beam for full continuity. This in T-sections requires some provision for taking the negative compression and this may be done by deepening the beam next the column in the shape of a diagonal bracket, or by connecting the tension rods by turn-buckles, or by some contrivance which would give them a direct bearing on each other, while some engineers go so far as to design with simply continuous rectangular beams.

Except in a very simple building, beams are not always in a row or of the same length of span; bracketing, turn-buckles and threaded rods are expensive, and the writer hasn't found that a continuous rectangular beam is as cheap as a single T-beam, because it does not utilize the compression strength of the slab as a T-beam does. So, assuming that it is safe and proper to design a single T-beam, the writer has yet to be convinced that such a beam properly reinforced for the negative moment due to deflection is not the best and most economical. It is the opinion of the writer that, when concrete buildings are constructed according to the best method of design and not simply the cheapest, there will be rods placed at the top of beams for their entire length, as well as at the bottom, to prevent cracks from expansion and contraction and unequal settlements of the foundation and to better tie the building together.

Italian Cities—XIX

Siena—II

SCULPTURE differentiated itself slowly from architecture, with which it was at first confounded, and this differentiation declared itself only after the coming of the brothers Niccolo and Giovanni Pisano, who left splendid testimony of their passage in the Cathedral where they executed the marble pulpit that is held to be their most perfect work. Linking to their modern times the traditions of antique art, the Pisani taught the Sienese the proper road to follow. The earliest of these sculptors, or at least the one to whom it is possible to attribute with certainty a known work, is Giovanni d'Agostino. By him there is a bas-relief, of slight dimensions, that represents the Madonna with the Infant Jesus on her knees, while at each side an angel holds out a vase of flowers. His contemporaries and successors who did not, as he did, sign their work have left only very vague traces of their labors. It is only in the fourteenth century that appeared the grand master, almost the only masterly Sienese sculptor, Jacopo della Quercia. His is fully the equal of the grand names of Florentine art and he reaches their level not so much by the externals of his treatment, by the affectation of attitude or by mannerisms—from which Donatello himself was not exempt—as by the power of the emotion, the depth and intensity of the feeling that inspired him and the breadth of his style, quite peculiar to himself. The nature of his genius makes one think more than once of that Titan of sculptors, Michael Angelo, and for a long time, in fact, they have been named together. Of a surety Jacopo della Quercia heralds the coming of the author of the "Moses" and the tomb of Lorenzo dé Medici. He has not altogether laid aside the crudity that the Gothic period impressed on everything, but has comprehended what grace is and what a smile may be; he understands the harmonious movement of the figure and the beauty of the human form.

His chief work, one unfortunately almost destroyed by the attacks of weather and the carelessness of man, is the Fonte Gaia, a fountain which stood in the city's chief square in front of the Palazzo Pubblico. He labored on it during seven years, from 1412 to 1419. The regional retrospective exposition of 1904 afforded the opportunity for collecting all the fragments of the fountain and rebuilding this chef-d'œuvre, which, though mutilated, still has an undeniable grandeur. The same exposition enabled one to behold, side by side, four statues of Apostles and one of the Virgin, carved in wood, gilded and painted, which really endured comparison with the figures of the saints that fill the niches of Or San Michele at Florence. The Baptistery, in the Church of San Giovanni, also has some bronze bas-reliefs due to the cunning hand of Jacopo, who also competed for the doors of S. Giovanni at Florence.

The names of certain of his pupils have come down to us. The most notable, Pietro del Minella, worked with his master on the Cathedral and the Baptistery. He had great influence on the Turini family, who also shared the labor on the baptismal fonts. Antonio Federighi, the period of whose productiveness includes the second half of the fifteenth century, resembled him in no way; he is even antipodal to Jacopo della Quercia and sacrifices truth to artificiality. Lorenzo di Pietro, called "Il Vecchietta," had a temperament that was far more sound. Donatello's work inspired him and the result is often seen in his own. Restless, always preoccupied with a desire for perfection and seeking the means to achieve it, a tireless, but impressionable worker, he tried every field and always succeeded in being interesting, even if at times his ideal seems open to discussion. With Giacomo Cozzarelli, better known as a wood-carver, and Lorenzo di Mariano, or Marrina, we reach the end of the glories of Sienese sculpture; the artist last mentioned, in fact, belongs rather to the decadence of the school.

We must rank Siena amongst the cities where architecture held a chief place. As soon as he passes through one of the gateways and penetrates beyond the city's wall, the traveler experiences the sensation of having been suddenly and miraculously transported bodily back to the heart of the Middle Ages. In fact the city has suffered very little through the introduction of modern fashions. On narrow streets, bereft of sidewalks, the blackened walls of ancient palaces rear themselves. High up above, the towers which used to serve for the defense of the houses, fortresses—massive and truncated, preserve still to these houses their original aggressive character. Often the streets are straddled by these houses, supported upon arches thrown from side to side as if for bridges; one has to pass beneath stone vaults and is oppressed with the sensation of living in times of long ago. Siena is the only city where one can discover the real character of the Italian Gothic. Only here and there does one come upon a piece of Romanesque work. One of the monuments that are purely Gothic is found nearby at San Galgano. The church, built by the Cistercian monks in the thirteenth century, is merely a heap of ruins, but enough of it is left to enable one to admire the purity of the lines and the audaciousness of the arches and colonnades. It is very interesting to compare this style deriving from the north with the Italian Gothic that is exampled in the Cathedral. There is, nevertheless, still another phase of Gothic in the city, and this is represented by the palaces which used to serve and still do serve as habitations for the noble families. The individualistic spirit that divided the petty Italian principalities or republics one from another was paralleled in the cities themselves by the antagonisms of separate families. Siena did not escape the general fashion, but manifested it quite as much by a rivalry in luxury as by feats of arms. From this necessity for outshining one's neighbors, or foes, were born all these palaces, the external indications of power and opulence.

It must be remarked, however, that the Cathedral itself has preserved something of the Romanesque manner and that its campanile has absolutely nothing Gothic about it, unless it is the black and white marble marquetry with which its walls are faced. One municipal palace, the Palazzo Pubblico, is the prototype of all the other palaces. Here brick is married to stone and marble, and the building is surmounted by a tower, left intact, happily, whose elegant lines were a constant joy to Leonardo da Vinci.

A description of these buildings will permit me to go a little deeper into my subject. What was the exact value of and what rôle was played by Sienese architects between 1200 and 1300 no one quite knows. In the following century we know a few names, as, for instance, Tino di Camaino and Lorenzo Maitani—who worked on the Cathedral at Orvieto. Angelo di Ventura built, amongst other things, three of the city's gateways, and, finally, Lando di Pietro, who had acquired a great name, was charged by his fellow-citizens with the task of directing the construction of the Cathedral.

The evolution which the Renaissance movement impressed on all forms of artistic creation was especially felt by architecture. Antonio Federighi was the propagator of these new forms, and to him we owe many gracious monuments, such as the Castello degli Diavoli, near the city. He died in 1490. His contemporary, Francesco di Giorgio Martini, was one of those all-round artists, such as were produced only in this epoch and of whom the grand Leonardo remains the most perfect exemplar. Savant, painter and sculptor, his activity was felt in every direction, and traces of his glorious work are found in many parts of the peninsula. To Giacomo Cozzarelli we owe the Palazzo Magnifico (the nickname of Pandolfo Petrucci) and the convent of the Osservanza, both of which, however, are lacking in originality. With Baldassare Peruzzi we fall into the false Classicism which clips the wings of every inspiration.

Finally, it is worth while to indicate the important place held by the Sienese in what, perhaps wrongfully, are styled the minor arts, notably in goldsmith's work, where such masters as Turino di Sano and his son Giovanni executed chefs-d'œuvre of patience and splendor thoroughly in harmony with the mystic character of the people.

The characters of these different artists—painters, sculptors and architects—are found expressed in the monuments they created. In an archaic *milieu* the discordances that might, that really did, exist between their several ideals became attenuated, disappeared, and finally became united in an ensemble that was full of nobleness, grandeur, faith, mysticism and beauty in many forms. This is due to the fact that the Sienese, from the

start, had for their city a profound veneration, a real love, which impelled them to strive together to accomplish that embellishing that the people desired. And the special veneration for the Virgin, as deep-seated in one of the old masters as in the others, served, in painting especially, to contribute to the discipline of individual talent and, by purifying it, gave it a refining and moving force that the new spirit of the Renaissance knew how to avail of.

Two buildings in particular symbolize the history of the city, its struggles and battles, and that restless agitation which urged it in every direction and finally cost it its liberty—the Cathedral and the Palazzo Pubblico. In one is condensed the entire religious and secular existence, and in the other is epitomized the civil existence of a people who are described by an ancient chronicler in these words: "The Sienese are a people much given to the ceremonial observances of the Christian religion; they are polished, forehanded and expend themselves in gracious customs."

The first Cathedral was not erected on the site where now stands one of the most beautiful of Italian churches, but actually some hundreds of meters distant, lower down, in the very center of the ancient engirdling walls, at the place now called Castelvecchio. As it grew, the city felt the need of replacing its metropolitan church, and it was then that was selected for the building of a church consecrated to the Virgin the site now occupied by the Cathedral. Between the years 1000 and 1200 this new building was enlarged, transformed, rebuilt, perhaps, from foundation to roof tree. At any rate, in the first half of the thirteenth century they were still at work upon it. The dome was finished in 1262. But, still not content, the Sienese kept on enlarging the Cathedral during the first quarter of the following century, extending its length as far as San Giovanni. Yet, considering the difference in level which existed at different points on the hillside, the architects committed sundry mistakes, the center of the building being displaced, the dome was no longer found in the middle. Then, in a burst of patriotic pride and religious faith, the authorities decided to build a new temple in honor of the Virgin, but more beautiful and larger than any church then known. And so it was done. But the expense to be borne was enormous, for the old building was to be but one of the arms of the cross forming the new one.

The great architect of the day, Lando di Pietro, directed the work, which was already allowing people to appreciate the grandiose character of this audacious undertaking when the terrible epidemic of the plague broke out in 1348. At once work was suspended, but presently was resumed once more; then, owing to the constantly increasing burden of outlay, the execution of the splendid design which had had only a beginning in actual execution was totally renounced and abandoned. As mute witnesses to this colossal undertaking which the necessities of the times caused to be abandoned, there remain imposing ruins, columns and arches which give a strange air to that part of the piazza once imposing in another manner.

It was now decided to embellish the old Cathedral, and this work was completed in the fifteenth century. The Sienese Cathedral has many points of resemblance with the Cathedral of Orvieto, although it has not the latter's perfection. For a long time the design for the façade was attributed to Giovanni Pisano, but prolonged inquiries have shown that this was not so, and now opinion as to authorship inclines in favor of Giovanni di Cecco. The monument, like Sta. Maria del Fiore at Florence, presents itself to the eye as an enormous checkerboard composed of white and black marbles, but the full-centered arch and the triangle are dominant. The pointed arch is introduced in a subordinate capacity and this is very singular. The façade in question is certainly later than 1370. Three doors of equal size give access to the church, each door being enclosed by full-centered archivolts, themselves crowned by triangular pediments. Above the central doorway blooms the great rose-window, reduced in form to a simple circular opening enclosed within a circumscribing square framing decorated with the carved figures of saints and pontiffs, all being crowned finally by the great triangular gable, flanked by two little turrets capped with pyramidal pinnacles, and all of the purest Gothic. Each of the lateral doors has above its crowning pediment a little gallery of six columns, the cusped arcadings recalling somewhat reminiscences of Arab architecture. Above these runs a string-course, and then comes the crowning triangular gablet which is flanked on the outer side by a tower pierced with window openings and from which jut many gargoyles, and here, too, arch and triangle are repeated, while the niches in the faces of its buttresses are filled with fine statues of saints, due to pupils of Giovanni Pisano, as, for example, Goro di Cinto. Some of the statues have had to be cut over in our own time, and so the absolutely antique character of the ensemble has been somewhat impaired. It is not known who was the designer of this façade, which was made over and transformed at the time when the scheme for the larger Cathedral was abandoned. The chief architect, as is said above, was in all probability Giovanni di Cecco. Certain statues of saints which, in the fifteenth century, had their place within in the nave and which are recognized as being the work of Antonio Federighi and Urbano da Cortona, have been brought outside and set up on the main cornice.

As to the six-story campanile, quite contrary to what is usually the case in such structures, it does not grow smaller and more pointed as it ascends; it preserves its lower dimensions throughout and this gives it a physiognomy all its own. The stained glass in the great rose-window is quite remarkable, having been executed in the middle of the sixteenth century by Pastorino Pastorini after the design of Perino del Vaga, who depicted the Last Supper with a knowledge of coloration that is really surprising.

The interior of the Cathedral demands of the visitor who is at all anxious to appreciate its beauty long hours of examination; it is, as Taine declares, a world wherein neighbor the most varied forms of art. It consists of three naves which continue to the choir and a transept divided into two aisles. An hexagonal dome crowns the crossing. At the first glance are discoverable traces of the several centuries which have made the whole such as it is now. Romanesque lines appear here, Gothic motives appear there, while the heads of the Popes ranged along the cornice below the clerestory windows are a device of Renaissance times. The grouped piers and columns have a bold effect.

HONORÉ MEREU.

(To be continued.)

Architeque[1] ?

LE Choix d'une carrière est le plus souvent difficile... On hésite,—le rêve serait peut-être d'hésiter toute sa vie—puis tout-à-coup on se détermine, et quelquefois pour des raisons que d'aucuns jugeraient futiles.

Ainsi, moi, je me suis fait architecte parce que ce mot me plaisait. Je trouvais qu'il n'y avait pas d'autre métier donnant un titre de même désinence:

Ce n'était pas un nom en *ier* comme courtier, serrurier, plâtrier, épicier; ni un nom en *eur* comme tailleur, ingénieur, vidangeur, procureur; ni un nom en *iste* comme ébéniste, chimiste, fumiste, lampiste; ni un nom en *in* comme médecin, pharmacien, marin, rapin; ni en *at* comme prélat, soldat, avocat, etc... bref j'étais enchanté de voir qu'aucune corporation n'exercerait en *ecte!*

C'était idiot, n'est-ce pas... mais j'étais content.

C'était du reste faux, car j'ai découvert depuis, à mes dépens et à ma confusion, — mais il était trop tard — que j'avais compté sans les contributions *directes* et même *indirectes* (hélas!).

J'avais encore d'autres raisons.

D'abord j'étais séduit par cette sorte de cousinerie que nous avons avec le Grand Architecte de l'Univers ! — Ce n'est pas un privilège banal, en effet, que d'être assimilé au Créateur.

Et de fait nous créons ! Nous mettons quelque chose là où il n'y avait rien. Chacun de nous peut dire à la pose de la premiére de son premier édifice :

«Tu es Pierre et sur cette Pierre j'assoierai ma renommée et ma fortune !...»

On est comme qui dirait des «surhommes !»

Et puis j'étais attiré par l'imprévu et la variété. On m'avait dit que dans notre métier on ne faisait jamais deux fois la même chose, qu'on passait sans transition du grave au doux, du plaisant au sévère....

On n'avait pas encore découvert le « modern style », c'est vrai; mais on avait malgré cela un stoc de styles permettant d'aborder tous les genres. Enfin chacun n'est-il pas libre d'avoir un style de plus en réserve : «le sien»? Tout cela était emballant.

Enfin, me disait-on encore, le commerce avec les clients est charmant, chacun d'eux devient notre ami; il n'est presque pas d'exemple qu'un Jeune architecte, un peu bien doué, n'ait pas épousé la fille de quelque cliente....

[1]From "L'Architecture et la Construction dans le Nord."

Ah quel plaisir (*ter*)
d'être Architecte !. . . .
. . . .

Et volià comment je devins architecte. J'en étais, et j'en suis encore fier !

Pourtant il y a eu un nuage.

C'était dans une petite ville, sous-préfecture de la Somme; j'explorais un jour un quartier ouvrier, lorsque mon attention fut attiré par une querelle entre deux mégères en furie.

La galerie riait. Toutes les saletés avaient été dites; il s'était fait un silence; et j'allais continuer mon chemin, lorsqu' après s'être recueillie comme pour lancer la suprême injure, l'une des femmes cria à l'autre :

«Eh, va donc ! graine d'*architèque !*»

La femme interpellée se retourna comme si une vipère l'avait mordue, et d'un ton d'indignation qui ne manquait pas de grandeur :

« Architèque ! Architèque ! s'exclama-t-elle, te sauras qui ny a mie jamais eu d'architèque din m' famil' ! »

La foule délirait, moi pas.

J'ai jugé prudent de filer... songez donc si on m'avait reconnu... *Architèque !* "RISOR."

ILLUSTRATIONS

SCHOOL BUILDING: OHIO INSTITUTION FOR THE EDUCATION OF THE DEAF AND DUMB, COLUMBUS, O. MESSRS. RICHARDS, M'CARTY & BULFORD, ARCHITECTS, COLUMBUS, O.: THREE PLATES.

THE CATHEDRAL, SIENA, ITALY: TWO PLATES.

For description see article, "Italian Cities," elsewhere in this issue.

A HOUSE IN PITTSBURGH, PA. MR. H. D. GILCHRIST, ARCHITECT, PITTSBURGH, PA.

HOUSE OF MR. NELSON, 1737 JEFFERSON AVE., DETROIT, MICH. MESSRS. CHITTENDEN & KOTTING, ARCHITECTS, DETROIT, MICH.

HOUSE OF G. E. SMITH, ESQ., PHILLIPS BEACH, SWAMPSCOTT, MASS. MR. GUY LOWELL, ARCHITECT, BOSTON, MASS.

Additional Illustrations in the International Edition.

ENTRANCE PORCH: HOUSE OF MR. NELSON, DETROIT, MICH.

NOTES AND CLIPPINGS

MILAN'S STABLE SPIRE.—Since the sudden fall of the great Campanile at Venice, a few years ago, scientific experiments have been made to afford assurance of the stability of other famous architectural piles in Italy. Among these is the unique Cathedral of Milan, built all of marble, with scores of slender pinnacles and a lofty main spire terminating in a great marble statue of the Virgin. The experiments of Professor Vincentini on this spire, while demonstrating its complete stability, show interesting effects of the wind and solar rays. As with other lofty towers, the point of the spire describes daily an elliptical curve, the size and precise form of which vary with atmospheric conditions. But the greatest displacement never amounts to more than a single minute of arc—in this case less than a third of an inch. A tempest of uncommon violence in July, 1905, displaced the top of the spire eight millimetres.—*Youth's Companion.*

STRIKES OF TWENTY-FIVE YEARS.—The Department of Commerce and Labor has issued a statistical report relating to strikes and their causes during the twenty-five-year period from 1881 to 1905.

During that period there were 36,757 strikes and 1,546 lockouts. The number of persons who went on strike was 6,728,048, and those locked out numbered 716,231. Because of the relations necessarily existing between enterprises of varied character, these strikes stopped work in many other places. The total number of people thrown out of work because of strikes and lockouts made a total of 9,529,434, and 90 per cent. of these were males on whom others were dependent.

The average strike lasted a little longer than twenty-five days, and the average lockout eighty-four days. The greatest number of strikes were in the building trades. Of the total number of strikes, labor organizations conducted nearly 67 per cent.

The strikers have succeeded more often than they have failed, only 32 per cent. of the establishments against whom the strikes were directed having been entirely successful.

About 4 per cent. of the strikes were of a sympathetic nature, the greater number of them being conducted for an increase of wages and a decrease of hours of work. Disputes arising out of a refusal on the part of employers to recognize the unions have caused about one-half of the lockouts.

Industry suffered less from these causes during 1905 than in any year since 1892. The report also shows that where arbitration has been resorted to by employers and strikers it has been uniformly successful.

THE AHMEDJIE MOSQUE, CONSTANTINOPLE.—Ahmed I., who ascended the throne in 1603, was, as became a boy of fourteen, emulous of the fame of Suleiman I., and desirous to erect a more noble mosque. Among all in Constantinople his alone has six minarets, and is therefore called Alty-Minareli-Djami. According to tradition, the Imum of Mecca was so horrified when he heard of the proposed irreverence—for the Kaaba he guarded had only six—he went to the Sultan to remonstrate with him. The young Ahmed could not deny his fault, but by a happy thought he proposed to add a seventh minaret to the Mecca shrine, towards which the thoughts of all true believers were then, as now, turned in devotional moods. In another feature we can perceive a desire to compete with the Suleimanic mosque. Sinan, the architect for that building, arranged eight piers for the dome, and made each a solid structure, in which the porphyry we have mentioned becomes only a partial facing. In the Ahmedjie, on the contrary, the dome and arches appear to have only the four massive columns, each about 20 feet in diameter, for support. They are the first objects which strike the visitor on entering, and from some positions near them the mosque appears larger than it is in reality.—*The Architect.*

AN IMPROVEMENT IN COLOR-PHOTOGRAPHY.—Messrs. Lumière, of Lyons, are stated to have at last solved the problem of color-photography. Since June 1 photographers have been able to produce from one plate results which hitherto have required three plates. On Lumière's new plate dots of red, green and blue are placed in regular proximity and so densely that 8,000 go to the square millimetre and eight milliards to a plate 9 by 12 cm. This colored plate, white to all appearance, is laid over the sensitized plate, the film on which is equally sensitive to red, green and blue.—*The Builder.*

THE CHARLEMAGNE STATUE, PARIS.—The equestrian monument to Charlemagne, by the Rochet brothers, on the Place du Parvis Notre Dame at Paris, is now to have a properly designed stone pedestal in place of the temporary one of wood and painted canvas which has long been there.

CONCRETE BRIDGES IN BAVARIA.—Without entering upon the relative merits of different structural materials, we refer here to three railway bridges with spans of 187 feet, 211 feet, and 211 feet, respectively, which have lately been erected in plain concrete on the three-hinged principle. All of these structures were designed by Mr. Beutel, Chief Engineer to the Bavarian State Railways. One of them, at Lautrach, crosses the River Iller, with a main arch span of 187 feet, and two smaller arches at the abutments. As the rise of the main arch is only about one-sixth of the span, the three-hinged system is particularly advantageous. The arch rib in this instance carries cross walls connected by small arches surmounted by the road upon which the permanent-way is laid. The two other bridges cross the River Iller close to Kempten station, where there is a network of several branch lines. One of these bridges carries four railway tracks, and the other only two, but their structural features are practically identical, the main arch of each bridge having the clear span of 211 feet, with the rise of about four-ninths of the span. We are glad to say that all three bridges were finished without the casing of stone or other veneer which some engineers seem to imagine is necessary for decorative effect. It is stated that the cost of the Lautrach bridge was 17 per cent. less and the cost of the two Kempten bridges was nearly 20 per cent. less than the estimated cost of steel bridges. The ultimate saving should be considerably more, owing to the fact that practically no maintenance is necessary in the case of concrete structures.—*The Builder.*

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SOCIETIES, PERSONAL MENTION, ETC. . . . . . .

IT is a great misfortune for American Art that the native modesty of American artists of every kind should have, in recent years, been so bewrayed by the ill-judgment of unbalanced critics and the ordinary penny-a-line writer for the magazines, who shower on each and every artist who possesses even mediocre ability all the adulatory adjectives and adverbs that the English language—and some others—provides. It can, however, safely be said that Augustus Saint Gaudens, who died last week, early in his fifty-ninth year, more nearly than most deserved the praise that has been bestowed on his work during the last twenty-five years, and yet we wonder whether each of his avowed admirers will take the trouble to procure and cherish one of the artist's masterpieces, as it will soon be possible for him to do in the shape of one of the new eagles or double-eagles designed by Saint Gaudens and forming a part of the new coinage now being minted. Born in Dublin, of mixed Irish and French parentage, he was brought to this country as a mere infant, and so was without question a product of American civilization, and to a large degree of American education; for, though he studied in Paris under Jouffroy and later modelled some of his work on the other side, he has not felt the need of expatriating himself for the sake of his art, as so many other artists have. Perhaps for this reason he has arrived at a better understanding of the American types, both physical and characteristical, than most artists have, and consequently his work appeals understandingly to the senses of the common herd with the force of homely familiarity, while the better instructed can appreciate the consummate technical skill that has known how to catch and solidify those characteristic expressions that are so elusive and yet so identifying.

CONSIDERING the large amount of work for private clients in the way of portrait bas-reliefs, busts, medals, decorative inscriptions and some statues done by Saint Gaudens throughout his life, but mainly in his earlier years, the number of his public statues is on the whole large for so conscientious a worker, and in themselves alone they prove how simply and persistently the sculptor devoted himself to his work. It is New York's fortune to possess several of these public statues, one, among the best as well as earliest of his product, the "Admiral Farragut," on Madison Square, while another, the "General Sherman," on the Plaza, which better deserves in these days of regulated street traffic the name of the "Female Cop," is, like all of the sculptor's equestrian work, unsatisfying. The best that can be said of it is that it is rather better than the "General Logan," at Chicago. As to the monument to Colonel Shaw, in Boston, admirable as in many ways it is, it gains much attention and applause through the mere unusualness of the conception, which combines in a single composition figures in the round, in high-relief and in low-relief; but the horse is not happy, and the allegorical figure floating in the sky above the martial group—representing nobody knows just what or whom—is, in the eyes of many, a distinct blemish. But the artist who could turn the awkward figure of Abraham Lincoln into the very embodiment of dignified American manhood, self-reliant yet conscientious, as at Chicago, the sculptor who could show how grief, too often disordered and blear-eyed, may be poetized, as in the case of the figure in memory of Mrs. Adams in Rock Creek Cemetery, Washington, has made a satisfying reputation that will endure for all time. The sculptor, although his work was hindered by the burning of his studio two or three years ago, left a large amount of work in various stages of execution, some of it so far advanced, as in the cases of the Phillips Brooks statue, the figures for the entrance to the Boston Public Library, and another Lincoln for the Creerer Library at Chicago, that his able assistants will be able to complete and deliver the work.

IN the course of his address on the use of the English language, delivered recently before the Technological Society of Kansas City, an address from which we lately published an extract, Mr. John Lyle Harrington narrates that he knows one contractor "who has grown gray in the business of constructing buildings, who has never completed a contract without a lawsuit, and who has *never lost a lawsuit!*" As these suits seem to have turned often, if not always, upon the interpretation of the language used in building contracts and specifications, and as the contractor seems never to have been non-suited, his knowledge of English as it should be written is so unusual that he might properly be called to fill the English chair at some Western college or technical school. Everybody knows that "specification English" is *sui generis*, but generally it is sufficiently clear for the purpose

and legally intelligible. If, however, this contractor was often called upon to follow specifications such as the one the following instructions are found in, we do not wonder he had to resort to law in defence of his omissions or his commissions. Says the specification in question, among other things: "All work to be done in a neat and skillful manner, and is to guarantee the construction and workmanship with a bond equal to amount of tender for a term of five years, satisfactory to the proprietors and the architects, to properly carry or support the loads it is designated to carry, namely, its own weight, the weight of the several floors, roof and walls resting thereon, a 10,000 gravity tank and the pressure of any wind which may not be designated a hurricane, and future three stories." This gem is found in a specification for a building to cost one hundred thousand dollars, and was engendered by "an architectural firm of some repute."

THE legislation that has been had in several Western States forbidding, or sometimes only restricting, the use of tobacco, especially in the form of cigarettes, must be classed as sumptuary legislation, and sumptuary legislation has, since the world began, been particularly obnoxious, and in consequence short-lived in its constraining effect. Undeterred by these historic facts, a firm of Philadelphia architects is reported to have undertaken a little sumptuary legislation on its own account, and, for one of the buildings it is about to erect, has framed a law that "no smoking or tobacco-spitting will be allowed during the progress of the work" under pain of "instant dismissal by the architects," and as the area affected and the term are not expressed, our purist contractor could find here a chance for another lawsuit, which an American jury would surely decide in his favor. In the old days, when the chewing of tobacco was the habit of practically every American mechanic, a habit now, happily, nearly obsolete, it was common for architects to caution both contractors and workmen not to spoil upper flooring and standing-finish with tobacco-juice, and friendly cautioning was all that was needful. In these days of prideful trade unions, we should suppose that this edict against tobacco-users, if actually promulgrated and enforced, might lead to an annoying series of strikes.

AMONG the very earliest settlers in this country, the Swedes for nearly three hundred years have been esteemed here as holding high rank as desirable citizens among the immigrants that are brought to this country, and, being such good material, it is rather strange that until now more effort has not been made to keep them at home. The inquiry that has just been set afoot by the Swedish Government, who seek to learn by a series of searching questions why it was that the Swedes now resident in this country ever left home, whether they are now satisfied the move was a good one, what in American manners and customs peculiarly appeals to them, and what changes must be made in manners, customs and laws at home before they can be induced to return and take up life in Scandinavia once more, promises to produce some curious and interesting information; but whether it will have the effect the Swedish Government evidently desire is extremely doubtful. The inquiry would be interesting at any time, but coming just now, after our Department of State has had to issue a new set of rules that define the right to American citizenship of foreign-born persons residing permanently abroad, it has a bearing on a very wide subject. The issuance of the new rules we speak of is due to the fact that certain foreign governments have discovered, through experience, that when their own one-time citizens return to them in the guise of good Americans, to take up the round of life where they were born, they are anything but desirable citizens. And yet, here is Sweden deliberately seeking to beguile back to itself a class of citizens who in other countries have been found undesirable because they have imbibed misunderstandingly what they conceive to be the essence and principles of American citizenship.

THE levelling process of thought and action is going on throughout the world so rapidly, under the operation of natural laws and individual fancy, that one hates to picture it making greater progress through governmental pressure, such as is hinted at in this Swedish investigation. It would be tiresome in the extreme, if we may suppose that this retrograde hegira could ever take place, for the American architect touring in Sweden to be confronted with American skyscrapers, reinforced-concrete packing-boxes on end, Beaux-Arted apartment-houses, department-stores like Roman palaces, school-houses like bad dreams of an Oxford quad, and churches in which the all-important elements are a swimming-tank and a gymnasium. One can endure these things now at home, for there is a chance to get away from them and, in a trip abroad, discover that architecture really may be an art based on purpose and feeling, and not a mere matter of stage scenery that is meant to last only so long as the play can be made to run. If all our immigrants having made their fortune in this country should, after the Chinese fashion, return to their native countries, the political turmoil that would inevitably ensue would be as nothing when compared to that that must take place in the arts.

IT appears that the P'ung-duk Pagoda raped from Seoul by Viscount Tanaka was not intended for that gentleman's private delectation, but has been set up in the Imperial Museum in Ueno Park, Tokio, and so stands precisely on the same footing as the Chinese astronomical instruments now at Potsdam. It appears, too, that the Japanese say it was removed from Seoul because the Koreans did not appreciate it, but allowed relic-hunters to break off and carry away bits of the carving. Hence it stands now in the same category with the Elgin marbles in London. On the other hand, it is said, in contradiction of the story that the pagoda was transferred voluntarily to the Japanese, that when Viscount Tanaka undertook to thank the Emperor of Korea for the gift, the latter informed him that he had made no such gift! Nevertheless, the pagoda has been transported, and the Japanese seem to feel not a little aggrieved that, though they have only followed good Occidental example, they seem to have excited a good deal of ill-natured criticism in different parts of the world.

Reinforced Concrete Building Construction[1]—II

MR. LEONARD C. WASON.—The writer has been much surprised at the great amount of factory work that is done at the present time in reinforced concrete. A great many inquiries in regard to such construction have been received and more than half of all his work is of this kind. The most encouraging point is that the initiative has in every case been taken by the manufacturers themselves, who have recognized the merits of concrete and desire to use it. The fact that it is being used for all sorts of mill purposes shows very clearly that it is a question of economy rather than of mere adaptability to some particular type of factory work. It is used in textile mills, where there are light loads and rapidly-moving machinery, which is the hardest type of mill construction to meet in price.

In considering the design for reinforced concrete buildings, the design of contraction-joints in walls will be first taken up. In early buildings, before there was much experience, very little steel was used in walls or floors to resist contraction, and they used to crack. Therefore the practice of using contraction-joints was followed. In early work, fourteen years ago, these were placed at intervals of about 25 ft. As further knowledge was gained, more steel was used and fewer joints, until at the present time there are no limits. The Harvard Stadium, which is 1,430 ft. around, was built with joints that were not expected to open, and only two have opened. A factory now building, 377 ft. long, is tied together from end to end without any joints whatever, the method being to use sufficient steel within its elastic limit to entirely exceed the ultmate tensile strength of the concrete at each section. In this way the steel prevents the concrete from cracking, but the steel has to be placed quite close to the surface to be effective. It is necessary to place it within an inch and a half of the surface to be protected, and the bars must be not more than ten inches apart, otherwise the concrete is liable to crack.

Walls may be considered under two general types, with subdivisions in the design of each. The most economical is to build piers to support the floor, the floor between piers being sufficiently strong to support a curtain-wall. This curtain-wall is filled in after the piers and floors are completed, either with thin monolithic construction or hollow blocks. This curtain-wall is bonded into a groove left in the piers to receive it. The other general type which gives the most durable and substantial construction, but is somewhat more expensive, due to the cost of centering, is to build the entire wall monolithic at one operation, the wall being of uniform thickness and solid throughout, or cored to form air-spaces between windows and where there are no concentrated loads. These cores can be of such size that the shell outside of core is not less than three inches thick. Such walls could be thoroughly tied together horizontally to prevent shrinkage, as above stated.

In the construction of separate footings, the octagonal is preferable to the square. It is very simple to design and build. To center, take four boards, nail together to form a square; nail another of the right length across each corner, and the octagon is obtained. The steel is placed in four directions. Every bar is of the same length and, therefore, all work with the same stress under the center of the pier. It is possible to use quite shallow piers; that is, the depth can be one-third of the projection beyond the edge of the column base, but this is not always wise. A depth equal to one-half the spread is a perfectly safe figure to use; that is, the depth from the bearing of the column base to the average depth of the steel is one-half of the projection of the concrete beyond the edge of column base. There should be at least 3 in. of concrete below the lower layer of bars to properly embed them and protect them from corrosion. If the size of these bars exceeds 0.75 in., the amount of the concrete below should be equal to at least four diameters. Where footings are placed in wet ground, as an extra precaution it is wise to use a mixture of 1:2:4, which is in itself waterproof, although concrete is such a good protector of steel from corrosion that, even in damp places, if a rusty bar is thoroughly embedded, in a month it becomes bright. It is economical to use a large bearing-plate under the column, as thereby the stress of the cantilever may be reduced and a saving in cost effected which is greater than that added by the extra size of base. Directly under the column the concrete is subject to cubical pressure and can, therefore, be loaded to almost any amount with safety. It is necessary to consider only the compressive stress of that portion projecting beyond column base in order to resist the compression from the cantilever action. In a footing of the character here described the shear in concrete can be practically neglected, because the shearing stress will always be low.

Columns may be built of concrete, or of a combination of steel bars and concrete working together, or as steel columns encased in cement. The use of all-concrete, using a rich mixture to increase the strength, is the best method, this being the cheapest form of reinforcement possible. One part cement to one part of crushed stone, with a working stress of 1-200 lb. per square inch, can be used. Tests made at the Watertown Arsenal indicated that at the end of one month the ultimate compressive strength of such a mixture would be at least 5,000 lb. per square inch, and therefore 1,200 lb. would be perfectly safe. Of course, using this method implies that considerable care must be exercised in mixing and placing. On large work which is being executed rapidly, without this care it might happen that the wrong mixture would be used in a column. This, of course, would be dangerous; but no practical difficulty has been experienced in changing mixtures and seeing that special batches were placed where wanted. Of course, it is necessary to carry a mixture right through the thickness of a floor as well as through the column. This can be easily done by placing vertical boards in the girders and beams meeting at the column, filling the rich mixture inside and the floor mixture outside, afterward drawing out the boards while both mixtures are still wet and are filled to the same level. In columns designed for concrete to sustain the entire load, use vertical steel in the piers only as a safeguard against possible eccentric loading or flexure and to obtain a rigid joint with the floor. If rich mixtures are carried to an extreme, columns might be too small in cross section. It is unwise to make any column 9 or more feet long less than 10 inches square.

When the load is divided between steel of any section and concrete, the stresses are distributed in the proportion of the moduli of elasticity of the two materials. Taking the ratio of the modulus of elasticity of steel to concrete as 10 and the working stress of concrete as 500 lb. per square inch, which corresponds to a mixture of 1:2:4, gives only 5,000 lb. per square inch as the compressive stress in the steel. With richer mixtures the ratio is less while the stress is higher, and the result is but very little different.

After concrete has set for a month it begins to shrink, and continues to for about six months, when it reaches its limit. During the first month the adhesion between the concrete and the steel becomes considerable, although it does not reach its maximum strength. The above-mentioned shrinkage when the concrete is exposed to the air on all sides amounts to 0.015625 in. to 0.03125 in. in length of 12 ft. Taking 0.024 in. as an average shrinkage, this shortening is equivalent to that produced by a stress of 500 lb. per square inch. As this exceeds the tensile stress of concrete, this latter stress, being about 300 lb. per square inch, may be taken as a force-producing compression in the steel, and by the reaction of the steel producing tension or reducing compression, as the case may be, in the concrete. It is on account of this reaction of the steel producing tension in the concrete that the tensile stress is used rather than the larger force, which would produce a shortening equivalent to 500 lb. per square inch. This tensile stress multiplied by the ratio of the moduli of elasticity would permit an additional stress in the steel of 3,000 lb. per square inch, and when combined with the load a total stress of 8,000 lb. per square inch, and in the concrete an apparent stress of 800 lb. may be used, which in reality, however, is only the 500 first mentioned.

In the actual construction of a building the concrete has about a month to set before any considerable portion of its ultimate load is brought upon it, no matter how rapidly the structure may be erected; and, as a well-designed structure should carry its maximum load when a month old, the above allowance of stress is legitimate and safe.

[1]An informal discussion before the Boston Society of Civil Engineers at its meetings held September 19 and October 5, 1906, published in the "Journal" of the Association of Engineering Societies for June, 1907, here continued from page 37, No. 1649.

The adhesive bond between steel and concrete is at least equal to the tensile stress. In some experiments it has been found to be very much greater. This is sufficient to transmit from the concrete to the steel, in the thickness of a floor, the increment of stress the steel must take through the story below. Thus the concrete is not overloaded in transmitting the stress from a floor to the steel in the column below. The bars should be faced and set on top of each other, being held in position by a sleeve. When bars are lapped, as is sometimes done, at the top of the splice, the concrete must take more than its proportion of the load coming upon the column in order to transmit to the lower bars in the length of the splice that portion which they are expected to sustain. Through the length of the splice the concrete is receiving more than its allowable working stress. This method of design is in somewhat common use, but it is not a safe method unless the concrete can carry a large part of the total load, and when it can the steel is of little value.

By increasing the size of the footing so that its cross-sectional area is more than equivalent to the area that would be required if plain concrete were used to carry the entire load of column, and by making it deep enough to absorb by adhesion the load carried by the steel, a bearing-plate may be omitted at the bottom, but this style of footing is expensive. It is always better to use a base plate of sufficient size to distribute the load from the steel bars over the footing. It can then be made shallow, as is usual, and economy results. In the Ingals Building, in Cincinnati, the columns in basement were about 34 in. by 45 in. in section. Near the center were two bars 4 in. in diameter and four bars 3.3125 in. in diameter to assist in carrying the compressive load. Near each of the outer and inner faces were five 1-in. square twisted steel bars to resist possible flexure and to make a rigid bond between column and floors, in order to resist flexure due to wind pressure. The load to be sustained was 1,550,000 lb. A cast-iron base-plate was used having a planed seat for each of the six large bars and enlarged to a bearing area on the footing of 4 ft. 10 in. by 4 ft. 7 in. This base-plate weighed over a ton. It is better to have a few big bars near the center than many small ones near the surface when they are designed solely to carry a compressive load.

By actual tests, conducted with care at various testing laboratories, it has been demonstrated that the steel does not sustain as large a load as might be expected from the above discussion. In a large enough number of cases to form an average, the columns carried but slightly more load than plain columns of the same dimensions and identical mixture. These tests indicated that the reinforced columns were not enough stronger to justify their use from an economical standpoint.

The combination of structural steel and concrete can be illustrated by describing one actual design. In a seven-story warehouse the roof and upper three stories were carried by concrete alone. In order to avoid too large a size, a structural steel column was used from this point to the ground. Two stories were carried by the steel work entirely. The two lower stories were carried entirely by the fireproofing of the steel, which in this case was made a little heavier than would be necessary for mere fireproofing purposes. Let it be emphasized that the two lower stories were entirely independent of the steel column within. This result was obtained by using countersunk head rivets to produce as smooth a surface as possible, and by covering the steel with a jacket which was sufficient to prevent any bond between it and the surrounding concrete, and to permit either to compress independently of the other. In construction the steel columns were first erected, the casing concrete of basement was put on, first floor cast, the jacket continued and the second floor cast. In the third and fourth stories the covering was for fire-protection exclusively, and, so far as the design was concerned, could have been omitted until the building was nearing completion. This method reduced the amount of steel required, because the two lower stories were supported independently, while the concrete jacket was but little larger than would have been used any way for fire-protection. A net saving thus resulted without an unreasonable size of column in the lower stories.

Hooped concrete columns are of little value, and should never be relied upon in ordinary designs. In order to get the value of the hoops the concrete must be compressed a considerable amount in order to cause a measurable lateral expansion, and when it has been thus compressed the safe working stress has been greatly exceeded, which is not a wise thing to do. Hooping should only be used as an added factor-of-safety to provide against occasional unusual heavy loads, which last for a short time only, in places where a large column cannot be used.

In regard to beams, so much has been written in the technical press that it is very little use to say more. There are, however, a few points worth considering, more particularly on the practical than on the theoretical side, because the theoretical side has been pretty well covered. From a practical point of view stirrups are quite useful. In ordinary construction work workmen sometimes fill in all the beams first and then fill in the panel cross-wise later, starting at one side and working to the other, so that by the time they have reached the end the concrete in the beam has begun to set. As the work is figured so that the panel acts in compression with the beam, there are liable to be serious results. Therefore, the stirrups are very useful to bind beam and panel together. The stirrups used in American practice to a large extent are useless, because they do not extend out into the panel. They should have a projection into the panel of at least a foot. Then the beam and panel are well bonded together. Experienced designers use them partly for that purpose, especially near the center of the span. If the whole floor is cast as a unit, of course stirrups are not necessary as a tie between beam and panel; but this is not always a convenient thing to do.

Once, years ago, the writer made a very careful study of long-span floor design to get the relation of spacing of beams to panels for the maximum economy, taking into consideration the cost of materials and the cost of labor as it then existed. That study led to the selection of 3-foot centers for the maximum economy. If the spacing is increased, weight is added to the beam and to the panel; and if it is reduced, the cost of centers is increased without a compensating saving on concrete and steel. This was the spacing which gave under those conditions the maximum of economy. This study has not been revised, but it is the writer's opinion that under present conditions, with the high price of lumber, which makes the beam floor much more expensive to center than the slab, and the higher price of carpenter labor, the spacing would be increased from 3 to about 4 feet for maximum economy. The practical considerations of mill design often require a different spacing. For instance, concrete floors are frequently held to the old form of mill frame construction—that is, beams 8 or 10 feet on centers and a flat slab between. This is less economical, but it is often necessary, and the difference in economy from the cheapest design is not very great.

A method of beam reinforcement which is coming into quite general use, and ought to become more general, is that of knowing exactly where and how the steel is set. If it is put in loose, it is likely to be misplaced while filling in the concrete; but if rigidly made up into units and anchored at their ends to other units or the wooden form, they are held exactly where they belong until the concrete is filled in; therefore the construction really agrees with the design. The recent type of construction of bent-up bars, crossing one another or fastened together over the columns, has forced into use one variation in design, namely, the joints between various days' work. Years ago they used to be made directly over columns. The beams and girders which met on the column were made double, and each half was cast on different days. But now there is such a network of steel there that it is almost impossible to put up wooden forms to stop off the concrete, and therefore the custom has come into use of making joints in the middle of spans. This is much easier to do from a practical standpoint, and from the theoretical standpoint does not weaken the construction in the least, because the tension of the concrete is neglected in the design. Better work is obtained from ordinary laborers with joints in the center of the spans than with split beams. After the concrete is thoroughly set there will be a shrinkage which pulls it away from these joints, and if they are over a column this shrinkage has sometimes split the column. To avoid this the plan was adopted years ago of using a steel plate, also hoops, to allow the beams to slip without splitting the column. This is now avoided by making the joints in the center of the span. However, this change requires considerable reinforcement of the top curface of panel over beams and girders, at right angles to them, in order to avoid tension cracks along their top surfaces. There is one point in designing that ought to be emphasized until its use is universal, namely, that all work ought to be designed on the basis of the working stress, instead of the ultimate stress with a factor-of-safety.

Some of the types of construction discussed are claimed to be covered by patents. Some are valid, while others, doubtless, are not. The so-called continuous girder, where bars bend up and run across support to unite with others from adjoining span, is probably a valid patent. Many have been using it without consideration of patentees, and if it is done wilfully those doing so

are likely to come to grief sooner or later. Also, there are some patents on the so-called girder frame which have to be considered. But as a general thing all patents recently issued are so narrow in their claims, and are so easy to avoid, that the desired result can be obtained without infringing on anybody else's rights.

Concrete placed around steel reinforcement of necessity has to be mixed considerably wetter than is necessary when placed in large masses. The right amount of water for reinforced concrete is that at which the concrete just quakes when tamped or spaded. At this consistency it will flow properly around the bars. If more water is used, the stone can settle through the mortar somewhat, as through water; thus the concrete would become of uneven density. By laboratory tests it has been found that the concrete which just quakes differs but little from the maximum strength obtained with the best consistency in plain concrete, which is a plastic concrete that does not quake. Extremely wet concrete, which flows nearly as freely as water, never develops as great strength as plastic concrete.

Mr. Joseph R. Worcester.—I should like to say one or two words on the general subject of the use of reinforced concrete for mill construction. There are some difficulties about it that must necessarily be met face to face. The principal one, I think, is in the size of the columns. I think there is a general feeling among architects and owners that reinforced-concrete columns ought to be built as small as steel columns, and the owners and architects have been forcing contractors to use every possible device for reducing the size of columns, and the contractors have allowed the reduction to go farther than is really safe in many instances. I think we must recognize the fact that we cannot build a reinforced-concrete column as small as a steel column and that if we are going to use such a column we have got to give it more space. This does not amount to much in a low building, of course, but in a high building the loss in space amounts to a great deal.

Personally, I do not approve of either of the methods of reducing the size of columns advocated by the two previous speakers. I think the objections each has raised against the system of the other are very well taken, and I should say you cannot properly reduce the size either by enriching the mixture to the extent that Mr. Wason advocates or by using the hooping which Mr. Hogue is in favor of. I think Mr. Wason's point against hooping is exactly right. If you put your coil of wire into the form and then put in your concrete, the tendency of the concrete if anything is to shrink away from the wire. It certainly is not going to enlarge and bring the wire into tension, and in order to get the wire into effective action some motion has to take place in the concrete within the wire. The Watertown Arsenal tests have shown that this motion is accompanied by deformation of the column, and I have understood from Mr. Howard that in his opinion the concrete is considerably disintegrated inside the hooping before the hooping has come into play. On the other hand, Mr. Hogue has said that with a rich mixture it is pretty hard to take care of the joints at the floor levels, and I believe he is right. Mr. Wason says it can be done, but I don't believe it can be done very safely. If you stop off your column under the floor girder, then the floor mixture bears directly on the rich mixture. That will overload the floor mixture, which is not so rich. If you carry the column mixture up through the floor there is danger of a crack, pretty nearly vertical, between the mixture in the beam and that in the column. There is, therefore, a point of weakness either way. So that it seems to me that we must start with the idea that we are going to have a pretty good-sized column, and unless we are going to have plenty of room for this, we must regard it as an objection to the construction.

Another point of difficulty in using concrete is the exterior of the building if it is made of this material. So far as I am aware, the last word has not been said as to the best method of finishing an outside wall of concrete. Nothing has been said about it by the previous speakers, and I don't propose to advocate any method of treatment, because I don't know which is the best. There is a great liability to cracks in any concrete finish, and it is doubtful whether the durability of the outside finishes used thus far has been fully demonstrated. I don't say this too positively, but I think we must learn a great deal more with regard to exterior finishes.

One other objection to concrete construction is that the loads upon footings in a reinforced-concrete building are heavier than in the case of wooden framing, and where the foundations are soft a good deal more expense is involved than in the case of wooden framing. This, perhaps, is not a serious point, but it has to be considered.

Now, a word as to the mill building Mr. Hogue has illustrated. It is apparently his intention to start the wall at the ground level. This does not seem safe on account of the fact that frost is liable to work in under and disturb the floor. This danger may be obviated by carrying the wall down below frost level, but it is not good practice to lay the first floor right on the fill unless it is remarkably good material, because it will settle and then you will have cracks. It is better to have some cellar, with posts, and to have the lowest floor self-supporting.

With regard to details, I wish Mr. Hogue had given us more information as to what he uses in his own practice. He has raised a lot of questions for others to answer, but it would have been of great advantage to us if he had given us the benefit of his own answers to these questions. Possibly we should not agree with him, but we would certainly like to know what his opinions are in regard to these matters.

His method of figuring footings may be scientifically correct, but I must plead guilty to a much simpler way of figuring these parts myself, a way which may not be correct, but if it is not I should like to be made aware of it. Where I have a square footing I take half the resistance of the earth on each set of rods. I assume that the rods in one direction take half the upward pressure and that the rods in the other direction take the other half. I assume that we have two central cross-sections at right angles to each other, each of which is virtually an inverted T. That is, in figuring this cross-section, I assume that the only value of compression we have in the concrete is the width of the top of the trapezoidal cross-section. I think that if you figure your two sets of rods in that way and take half the pressure on each, you get safe results, so far as I am aware. I think we must always take into account the shearing force which Mr. Hogue referred to. My practice is to allow 100 lb. to the square inch on the area obtained by multiplying height by perimeter, and not to consider the diagonal tension as we would in a beam.

With regard to the spacing of rods in the stem of beams, Mr. Hogue said that horizontally he spaced them from 2.5 to 3 diameters from center to center. There is quite a difference between 2.5 and 3. I am rather in favor of 3 myself, for the reason that the shearing area above the rods in that case is about equal to the circumference of the rod, and you have about the same unit in shear which you have in adhesion, which I think is about right. There is quite a pressure brought upon engineers sometimes to allow a closer spacing, even down to 2 diameters from center to center. That seems to me a dangerous practice. As far as the spacing vertically, which Mr. Hogue referred to, goes, I can't see any great objection to the practice of the Hennebique Company of putting two rods one over the other in contact. I would like to know if this is really unsound from theoretical reasons. I haven't been able to see them myself.

So far as lapping the rods at the end is concerned, I cannot see why it is not all right to lap far enough so that the strain in one rod may be transferred to the rod in the opposite direction by adhesion, and if you consider 40 diameters of the rod sufficient to develop its strength, it seems to me that a lap of 40 diameters is enough to transfer the strength from one rod to another close by.

I will say one word more in answer to Mr. Hogue's questions in regard to continuous beams. There are several objections to considering beams as continuous and to methods in use for making them continuous. In the first place, if you have real continuous construction, you want to have more tensional strength at the top of the beam over the support than at the bottom of the beam at the center. That, of course, means that you have more compression at the bottom over the support than at the top at the center of the span, and where you use T-construction, as we do almost altogether, this means that you cannot use as much steel, by a good deal, as we like without overstraining your beam in compression. Mr. Hogue suggests that that can be relieved by the use of bracketing, but on the top of your bracket, between the bracket and the beam, you are almost sure to have a joint, because you fill up to the bottom of the beam and lay the beam afterwards, and you have a weak spot there for transference of shear into the bracket. Then, again, it seems to me that it is not good engineering practice to assume that your beam is fixed over a support when it is only so fixed either by stiffness in the column or by the live load in the adjoining span. You have very little stiffness in the column and you can't count on the live load in the adjoining span. It seems to me that it is better

practice to figure your beams as if they were supported at the ends. While I do not believe in figuring on the continuity, it is, nevertheless, necessary to reinforce to some extent at the top over the supports, and that is a thing that cannot be emphasized too much. If you allow any sort of concrete construction to go over an approximately fixed support without being reinforced at the top over the supports, you will have cracks in the surface where they will be very conspicuous. This reinforcing at the top may be thrown in as added security.

Mr. Wason referred to joints which he makes in the centers of his beams as "contraction joints." I don't see how they can be "contraction" joints where your reinforcement runs through, as they must at the bottom of the beam. They are really set joints, but I do not see how they can be contraction joints.

The Architect's Coadjutors

IT is so unusual for the successful architect to acknowledge, to himself or to others, the reality and magnitude of the debt he owes to his co-laborers—whether unacknowledged "ghosts" or recognized employees—that it is particularly pleasant to find Mr. John Belcher, A. R. A., the recipient of this year's Royal Gold Medal, acknowledging his indebtedness in a very simple and handsome way in his reply to the presentation speech. In part he said:

I am overwhelmed with confusion when I call to mind—and it is so easy to call to mind—the names of many great architects, both at home and abroad, who are far more deserving of this great distinction than I am. As regards many, if not most, of these I am able to console myself with the thought that they are younger than I am, and I may hope to have many an opportunity of being here to see such honored with the Blue Ribbon of the profession. But even so, allowing the consideration that this Gold Medal is awarded annually to have its full weight, the sense of my own defects and limitations is strong upon me; but the way in which the President has made the best of the material at his disposal leads me to hope that you may give me credit for some at least of the virtues and good works he has ascribed to me. You have encouraged me to believe, Mr. President—and I am sincerely grateful for the encouragement—that if my work has not been large or extensive in area, at least its quality is appreciated, and that it has been fruitful of suggestion to younger members of the profession who are devoting themselves to carrying on that elastic form of Renaissance work which is now becoming so popular. I have always aspired to do really good work, and particularly work which should embrace and include in its scope the sister arts of sculpture and painting, and you almost persuade me, Mr. President, that I have not labored in vain. If, indeed, I have achieved success in this respect, let me acknowledge at once my indebtedness to my association with so many great sculptors; such, for instance, as my old friend Mr. Hamo Thornycroft, also Mr. Harry Bates, Mr. Geo. Frampton, Mr. Goscombe John, Mr. Drury, Mr. Pomeroy, Mr. Bertram Mackennal and others, all of whom at one time or other have lent their aid in giving expression and artistic embellishment to my buildings. But let me assure you also that I have been most fortunate in the men who have been associated with me in the carrying out of my work—men of ability and enthusiasm, responsive to the call of art in its highest forms, kindred spirits with whom I have spent many happy hours and passed through some thrilling experiences of the kind familiar, no doubt, to all who work in an architect's office. Amongst the earliest of my friends was Mr. James Walter James, whose remarkable powers of organization proved invaluable in the introduction and ordering of business methods in my office. Then came Mr. (now Professor) Beresford Pite, of whose strong personality and versatile genius there is but little need to remind you. I think it was while he was still with me that he won the Soane Medallion with his celebrated design of a Mediæval West End club. Since then he has surpassed us all in the beauty of his Renaissance designs, and is, too, a distinguished exponent of the pure and refined methods of Greek architecture. Professor Harry Wilson, of South Kensington, now distinguished not only in architecture, but as a painter, sculptor and worker in metals, was also with me for a time, leaving me, in the first instance, to join my old and sincere friend Sedding. Professor Reilly, of Liverpool, was not long in my office, but long enough, I hope and believe, to have enjoyed some of the work we had in hand then. Besides these three professors there are many others I could name who have won distinction, such as Needham Wilson (Institute Medallist 1884 and Soane Medallist 1886); Thomas Phillips Figgis; Hubert Corlette (Owen Jones Student 1896 and Institute Medallist 1899); also Messrs. James Fulton, James Charles Cook, James Scott, Balfour Paul, Lionel Detmar, Curtis Green, Herbert Ibberson, George Malcolm and others. Many of my pupils also have done credit to their sojourn in my office. Messrs. Philip Johnston, Alexander Hennell (Tite Prizeman), William Chadwick (now in South Africa), T. H. Russell and Maberly Smith and others. Then there is my present loyal and efficient staff, every member of which I appreciate; and last of all, one who is a host in himself, my trusty friend and partner, John James Joass (Pugin Student 1892, and Owen Jones Prizeman 1895). I may say we are so thoroughly in sympathy that my burdens are lightened by his efficient aid. These have all been real friends and true fellow-workers, and one of the happiest occasions in my life was when recently all the members of my staff, both past and present, met to entertain me at dinner during my term of office as President of this Institute—a token of their esteem and affection which was, as you may easily imagine, most gratifying to me. An architect may well count himself happy when he is loyally supported by men who know and lend themselves to his methods, even when they regard them as peculiarities, or even weaknesses. The last-named, the weaknesses, are especially open to the quantity-surveyor, and I esteem myself fortunate in the services in this capacity of so able and so conscientious a man as Mr. Gleed, with whom my younger brother, Mr. Arthur Belcher, having very wisely devoted himself to this lucrative branch of the profession, is in partnership. Then there are the builders, to whom I am greatly indebted for the careful attention paid to my wishes and directions, notably Messrs. Colls & Sons, who have carried out so many of my city buildings in the perfect manner for which they are justly noted. Amongst the hosts of individual workers, craftsmen and others whose skill has been so faithfully employed in my service, I must mention by name my old friend Mr. Brindley, if only to acknowledge how much I have learned from him. We all know Mr. Brindley as one of the greatest of living authorities on the different kinds of marble and their right use, but I know also how true is his love of art generally, and how good his judgment in all that pertains to his craft. It is of great consequence to an architect that his associates should be such as can interpret and carry out his work sympathetically and intelligently. The architect has been likened to a general directing the operations of an army of workers; but to my thinking a happier and more suggestive comparison is that of the conductor of an orchestra leading and directing the executants in the interpretation of a work of his own composition. I prefer this because, as I understand the art of war, even in these scientific days the vast majority of the units engaged are mere machines, whereas the architect, like the conductor of the orchestra, has to do with many minds. The various musical instruments in their sensitiveness and capacity of expression are responsive to the mind of the performer, and the musician has not only to understand the powers and limitations of each that he may build up his harmonies correctly, but if he would himself conduct the orchestra there must be mutual confidence and a sympathetic understanding between him and the executants. Only thus will he be able to secure a proper balance and proportion, a right tone or color, and such subordination of one part to another as will constitute the whole a perfect work of art. The executants, of course, must one and all be of the very best. A single incapable or ineffective unit may spell disaster to an army; the disaster is certain and inevitable if there be a single weak or faulty performer in the rendering of a musical composition. The architect may well address his subordinates in the words which Pericles is said to have used to Phidias and other artists at Athens: "O ye who expect me to undertake great works, zealously prepare yourselves and har-

bor no inert self-confidence. None whose hands are not experienced and on whom Athene has not looked kindly will ever be employed by me." It is obvious also that the more frequently the same men work together, the more thoroughly will they understand one another and adapt themselves each to his part in its relation to the whole. The several workers will acquire confidence in the architect and an intelligent insight into his thoughts and purposes as expressed in his designs. He, on his part, gaining confidence in them, will be able to allow a certain amount of freedom of expression to the craftsmen under him, and thus give them a fair opportunity for the exhibition of their powers. Now, more than ever, we want "men, not machines." The architect will not use his fellow-workers as an organist uses the stops of an organ; for the organ is a single instrument controlled by one mind, whereas the architect has to deal with a full orchestra of minds, all working together to one end, viz., the interpretation and expression of the architect's designs. The more perfect and sensitive this combination is the more closely will the accomplishment of the work approximate to the ideal. The organ, wonderful and perfect as the king of musical instruments, is not a true type of the architect's work, but of the painter's, the various stops being employed, like the pigments of the artist, to obtain color effects. As regards the work of the painter and the sculptor, I have always contended and struggled for the collaboration of these with the architect, even in the days when such an idea was regarded as quite utopian. I am glad I have lived to see the arts drawing closer together and even now working in unity. It is the architect who is (or should be) in a position to bring about this combination, which in its completeness is the most powerful that can be attained. The building which shelters and provides scope for the art of the painter and sculptor is the work of the architect, and it is his to furnish the opportunities and the settings and to determine the subjects of the joint work. In all cases the artists should work together *ab initio*—in the case of a building under the leadership of the architect; in the case of a monument under that of the sculptor; and in the case of a gallery or other place for the exhibition of his art under that of the painter. This is quite a different thing from the mere (and sometimes casual) providing space or place for the independent exhibition of works of art. The true collaboration of the arts leads to far higher and nobler results than the haphazard kind of arrangement that has so long prevailed, and I trust that the day is not far distant when the students of the various arts will be more completely organized and associated than they are at present, and will be set to work out problems together, and together accomplish noble works in which they can join hands and hearts.

The Illicit Commision

JUST as there are few men who could tell a good story with the zest and expression that the late W. L. B. Jenney knew so well how to work into his anecdotes, so it is true that his breezy personality affords abundant food for the story-teller. Knowing the man and his way of acting and speaking, we are quite sure that the following anecdotes are in no way apochryphal:

Jenney despised worse than anything the grafter, and his manner of dealing with the type of man was effective. Architects have peculiar intimacy with graft because they constantly are running into contact with crooked contractors and builders, and too frequently architects disgrace their profession by dividing with dishonest contractors the fruits of robbery achieved through crooked bidding or favoritism.

Jenney never countenanced this way of doing business. One day, writes S. N. Hughes in the Chicago *Tribune*, Jenney was in his private office when a man who wanted to provide certain materials for a building then under construction came in and approached John Ewen, then a "cub" in Jenney's office, with a flagrant bribe offer. He offered Mr. Ewen $50 if his material was used.

Mr. Ewen was seized with an inspiration. Instead of throwing the man out of the office, he said: "Mr. Jenney always handles that end of the business. Go in and see him." Then he awaited the explosion.

The man innocently approached Mr. Jenney and made the proposition.

"Sit down a moment," said Jenney quietly. A moment later he looked up and said: "Young man, are you new in the business?"

"Yes, sir. I'm just starting. I want to get in right. My stuff is good, and I want a chance."

"Well," said Mr. Jenney, "there are two ways to do business. If you want to do the best kind of business, with the best firms, don't do as you have done to-day. I have no doubt that is the way to do business with some firms. If you are after that class of business, that is the proper way to get it. But if you want the best business, don't approach any one as you have me. I'll give you the contract at your figures. If you can afford to give me $50, you can afford to knock $50 off the price to the owner. Let's reduce your figures $50 and give the builder the benefit."

The man agreed. He learned his lesson well, and he did business with Mr. Jenney for years. When Mr. Jenney died this man testified that it was that one business lesson that made him realize that the only way to do business is to do it straight.

When Mr. Jenney dismissed the man that day after signing agreements he stepped out smiling to Ewen and remarked: "Thought you'd have some fun with me, eh?"

Another and severer lesson he administered to a big contractor downtown. This man was prominent socially, financially and in religious circles, and through Jenney he got the contract for a skyscraper down town. One day, while the building was in course of construction, he entered Mr. Jenney's office and handed him a check.

"What's this for?" asked Mr. Jenney.

"It's the usual 10 per cent. of the first payment—your share," he added, significantly.

Mr. Jenney took the check, chatted for a time with the man, and finally went out into the workroom.

"What is the amount of that contract?" he asked Mr. Mundie, his partner.

Mundie told him.

Jenney figured for a moment, muttered, "Yes, the amount is correct," and then returned to his private office and indorsed the check over to the owner of the building.

Nothing more was heard of the matter until the end of the month, when the crooked contractor received from his bank a check indorsed both by Mr. Jenney and the owner of the building.

There was nothing for him to do but to take his medicine. He appeared in Jenney's office, probably expecting to be flayed for his tactics, but nothing of that sort happened. Mr. Jenney remarked: "I am extremely glad to know that you can afford to make the lowest bid on a building, and give the owner 10 per cent. back and still make money on it, but don't you think it would be more business-like just to subtract 10 per cent. from the total contract price and save all this red tape of sending the check to me and having me indorse it over to the owner?"

The contractor humbly admitted that it was.

There was not a word of condemnation or reproof and only a few who learned of it from the owner ever knew of the occurrence.

Mr. Jenney did not cast out that contractor, but continued to do business with him. And when Mr. Jenney built his own home he gave a contract for part of the material to this man—and the man skinned him.

The Habri Bond for Brickwork

THE majority of engineers and some builders frequently leave the question of bond in brickwork to the unhampered choice of the working mason. Such casual proceeding is seldom attended with any serious risk in case of walls whose thickness is the length of a single brick, for here the bricklayer will be pretty certain to adopt either the Flemish or the English bond, both of which are unobjectionable in the majority of cases; though the latter is distinctly the sounder arrangement. When, however, as is the case in the majority of works which engage an engineer's attention, the thickness much exceeds that of a single brick, consequences of such neglect in detail are frequently deplorable. We have seen large masses of brickwork—notably in lock walls—consisting of nothing but headers: if we except those stretchers which appear on the exposed face of the wall and which of course occupy but a minute fraction of the wall's cross section. Such a structure, if we ignore the adhesion of the mortar, has but little more longitudinal strength than has a huge fagot of short sticks without that string which is usually provided by the woodcutter.

It is scarcely surprising, therefore, that the majority of such walls develop transverse cracks even when they are exposed to nothing more in the way of bending-moment than is incidental to ordinarily careless construction.

The main desiderata of a good bond are three: (1) The bricks should overlap in each direction an aggregate extent which is approximately proportional to the bending-moment or shearing-stress to which the wall may be exposed in that plane. (2) The bond should not necessitate the cutting of bricks. (3) It should be applicable to walls of all thicknesses and yet sufficiently simple to be easily learned by the ordinary bricklayer. The "Habri" bond preeminently satisfies all these requirements: the first two demonstrably; and, concerning the last, we have never met a mason who did not readily comprehend the system as soon as it had been illustrated in his presence by the piling of a few dry bricks.

In the Habri bond every course, in a wall of indefinite thickness, is essentially identical with every other course; and consists of a cycle of three rows of bricks: two rows of stretchers followed by one row of headers. This arrangement in each course is, however, shifted half a brick in a direction at right angles to the rows, as compared with the course upon which it rests: the direction of the shift remaining constant throughout the wall's height. When, under the above clause of this rule, a row of headers would be divided by the plane of a face of the wall, a row of half bricks is *not* inserted but a row of stretchers substituted.

In the case of a wall half-a-brick thick, this bond necessarily reduces—as do all other bonds—to a wall consisting of stretchers only. When the wall is one brick thick we have one course of headers only, followed by three courses of stretchers only: the arrangement being here identical with common English bond, which is undoubtedly the soundest arrangement in a one brick wall under ordinary circumstances.

It is, however, in walls exceeding one brick in thickness that the value of our systematic rule becomes evident. Starting from the face an arch abutment of indefinite thickness would have in its first course one row of headers followed by two rows of stretchers; and so on. The second course would show one row of stretchers followed by one row of headers and then two rows of stretchers: the last three rows being repeated indefinitely. The third course would consist of two rows of stretchers followed by one row of headers; and so on. The fourth course would have three rows of stretchers next the face followed by the usual cycle of one row of headers and two rows of stretchers. This completes the cycle of courses, the fifth course being identical with the first not only in arrangement, but also in horizontal position. In the case of a wall under a vertical load, the *direction* in which the half-brick step by which each course has its arrangement shifted as compared with that of its predecessor, is made, has no importance, though of course it should remain unaltered throughout the wall. When, however, the wall is exposed to an inclined thrust it is preferable to make the shifts as you ascend in the same direction as the thrust. Thus in an arch abutment the shifts are made from the face; in a revetment wall towards it.

The name "Habri" is that of a distributary channel upon which the bond was first employed some twenty years ago.—*Indian Engineering.*

ILLUSTRATIONS

SOME OF THE BUILDINGS OF THE CARNEGIE TECHNICAL SCHOOLS, PITTSBURGH, PA. MESSRS. PALMER & HORNBOSTEL, ARCHITECTS, NEW YORK, N. Y.: SIX PLATES.

THE RYERSON PHYSICAL LABORATORY: CHICAGO UNIVERSITY, CHICAGO, ILL. MR. HENRY IVES COBB, ARCHITECT, NEW YORK, N. Y.

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Additional Illustrations in the International Edition.

ENTRANCE TO THE MITCHELL TOWER OF THE REYNOLDS CLUB: CHICAGO UNIVERSITY, CHICAGO, ILL. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, CHICAGO, ILL.

NOTES AND CLIPPINGS

FOUNDATIONS BY MECHANICAL COMPRESSION.—A method of forming massive foundation piles, employed for some time past in France, is that introduced by the "Société de Fondations par Compression Mécanique du Sol," of Paris. The process is specially intended for unstable and readily compressible soils, and may be briefly described as follows: A conical weight or ram, about 9 feet long by 2 feet 9 inches diameter, is slung from a triangular steel tower and allowed to drop point downwards into the ground rapidly, forming a deep cylindrical hole, into which pieces of rock are dropped, followed by smaller stones or rough concrete, each layer being well tamped by a ram of ogival form, the effects of this being to widen the original hole, especially near the base, and to consolidate the materials into a firm foundation pile or pier. An improved type of apparatus recently devised for handling the rams consists of a circular platform carrying the hoisting tower, a steam winch, and a steam boiler. The platform can be rotated through a complete circle, and at the top of the tower is a jib, these features permitting the ram to be operated over an area of considerable radius, without shifting the machine bodily. In situations where a firm stratum cannot be reached at practicable depth below the surface, the piles formed by the aid of this process are still capable of offering very considerable resistance owing to their large bearing surfaces. In water-logged soil, if the sides of the hole rammed in the first instance are not capable of holding up water, clay is introduced and spread over the sides of the hole by the action of the ram, and so forms an impermeable lining. In addition to its use for the foundations of heavy buildings, the method can be applied with advantage to foundation-work for bridges and other engineering structures.—*The Builder.*

ST. NICOLAS, GHENT.—An interesting restoration of this church is in progress, at the present moment, involving the removal of the plaster and whitewash, and showing the stonework underneath, with brick vaulting between the ribs. Of late years the wretched hovels round the church have been removed, revealing interesting work, and, of course, making the church safer from the danger of fire. The apse and chapels can now be seen and studied from close to; the gable over the south porch has been cleared right down to the ground, and the western aisle-fronts have been denuded of the shops that used to be there. Inside, as in the case of the restoration of Notre Dame, Bruges, a triforium has been discovered over the nave arches, on the removal of the plaster. It is to be hoped that the Commission Royale des Monuments will not allow the windows of the tower to be "restored" out of recognition by the insertion of a totally different style of tracery—an idea that was proposed, some years ago, but subsequently vetoed. Probably some strengthening works of the tower will be required, in which case we may expect to see the arches reinforced much in the same way as at Canterbury. Whether this will be done with a view to re-erecting the spire that used to crown the tower, or not, remains to be seen.

STA. SOFIA, SALONIKA.—A French antiquary was recently given permission to remove the whitewash from the great mosaic in the dome of Sta. Sofia, Salonika. The scraping has been successfully carried out, and the picture, the Ascension, is now to be seen in all its original freshness. The coloring is chiefly cobalt, pale blue and gray blue, and the faces are Byzantine in feature. The earth is studded with green and gold cubes, as also the flowers which grow up between the separate figures. Sta. Sofia was built in the Xth century and in the XVIth century turned into a mosque by the Turks, who allowed the Greeks forty days in which to build themselves another church, thereby limiting both size and splendor. In 1890 Sta. Sofia was partially burned down, and has not since been used.—*The Builder.*

NOTRE DAME DES CHAMPS, PARIS.—The Church of Notre Dame des Champs, near the Mont Parnasse railway station in Paris, is about to be removed in order to obtain a site for a postoffice.

MOSAIC WORK AT THESSALONICA.—Splendid churches built in the first centuries of the Christian era are now the Turkish mosques, but they are much less disfigured and disguised than are the churches of Constantinople. The round church of St. George, built probably about 400, is the most beautiful example of Byzantine mosaic in existence. The work is exceedingly fine; the cube used is smaller than that used in St. Mark's in Venice, or at Monreale, the smaller size giving a refined and beautiful effect, difficult to describe on paper. A ruined ambo from this church is now in the Imperial Museum in Constantinople, a superb mosaic indeed. The church of Holy Mary, now the Mosque of Eski Djouma, is very large and magnificent, gleaming with marbles and glittering with mosaics.—*Glasgow Herald.*

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THE New York *Sun*, a metropolitan newspaper of standing and large circulation, has recently published an entertaining article explaining "how architects get work," and has done it good-naturedly, truthfully, and in a manner that will really interest the general reader. More than this, it may well cause the man on the point of placing a job in an architect's hands to stop and consider how well-advised his action really is, and just what are the motives or whence come the impulses that are guiding his action, and this may cause the loss of a job here and there to a reasonably able and deserving architect; for, often, there is no very good reason for the selection, or rather the selection has actually been forced on the owner by an adroit architect or the still more adroit "promoter" whom he employs. It is in dealing with the promoter that the writer of the *Sun's* article becomes most interesting, for among other things he shows how a certain architectural firm is on the high road to much wealth, and will assuredly arrive at their goal unless their promoter, who is associated with them as a partner, should chance to ruin his health through the drinking of much tea at afternoon functions; for it is through his charming manner, his consummate social address, which finds ample play during his assiduous attendance at social occasions, that he succeeds in knitting the links of the chains that draw wealthy and desirable clients to the doors of the office where his partners, the real architects, are waiting, ready to serve whomsoever may come.

HOW should an architect get his work? It is a serious question that each beginner has to ask himself, one that has been put to us more than once. There is but one answer, and that is: he must be "known of men." But this hardly helps, as it simply causes the query to be changed so as to read: how may an architect make himself known? In a certain number of cases the answer comes naturally, and in course of time: the draughtsman who is of the right stuff to make an architect, and who has proved himself of exceptional value to his employer, is taken into partnership, and his name thenceforward becomes as well known as that of his partner. But the men who become known in this way are usually men who, though capable and well educated, have to depend on their daily wages, and so are rather forced to graduate from the bench, as it were. But there are others willing to take more risks, perhaps, more confident in their real powers, or, happily, possessed of independent incomes, who do not care to wait to be known until middle-age overtakes them, but wish to gain name and fame—and money—while young. How shall these be known? They cannot advertise in a commercial way as can business men, since it would be "unprofessional," and such advertising as can legitimately be done on a door-plate is not likely to be very productive. If they are unwilling to adopt the old-fashioned course of establishing themselves in some new community, growing up with it, becoming known therein by daily intercourse with their fellow-citizens, and satisfying their needs as they develop, then there are only three ways open: To make an alliance with a speculating builder; to seek success by constant participation in competitions of all kinds; or, frankly, to tout for work.

OF these three methods the first is dangerous, as it almost inevitably leads to a lowering of the moral tone and a debasing of artistic and ethical standards; the second is absolutely professional, and, in spite of the manner in which established architects talk against the method, is altogether too good ever to be abandoned. As to touting, there is much more of it done than architects will be ready to admit, for methods of touting are almost as various as men are numerous, and methods one man would employ would be scorned by his neighbor; and yet most of the methods actually used are permissible, decent and professional. The method that is at once the most legitimate and most successful is social touting, which consists simply in mixing with one's fellow-men as often and as widely as possible through membership in one or more clubs, in becoming an active member of a church congregation, and in taking part in such social functions as are accessible. And it is for this reason, we fancy, that Sir Aston Webb reminded the architectural students of the Massachusetts Institute of Technology that they should take care to acquire a broad and general culture, quite as much as skill at the drawing-board. The cultivated man in society will become known—and so draw to himself chances of securing work through and because of his displayed intelligence—in a way quite beyond the grasp of his fellow who has scorned to spend time and means in acquiring knowledge that did not lead by the shortest route to bread and butter.

BUT when all is said, the best agency for becoming known, the one that has had an effective part in the upbuilding of every architectural reputation in these

days, is nothing more nor less than the printing-press. It is the legitimate advertising given, without pay, by newspapers, magazines and professional periodicals that has made familiar to readers in every part of the world the names of architects in association with their accomplished deeds. It is quite common for architects to say that they derive no benefit from the publication of their work in the pages of the professional press, because the circulation of these among the general public, the mass of possible clients, is very limited. This argument is good, so far as it goes; but if the periodical press does not widely reach the general public, it does reach the editors of newspapers and magazines, and informs them as to who is who and what is what, and from that point they carry on the free advertising in a more effective way. In other words, publication in the professional journals is the first step on the pathway of the only form of advertising that is open to the profession. The last thirty years has witnessed the appearance and the disappearance in this country of a bewildering number of architectural journals, and the editors and publishers who have lost health and money in these undertakings are remembered only with pity, if not with scorn; and yet what they did, while they were able to do anything, was really to give substantial aid to the making of the reputation of many an architect who, now that it is made, fancies it is wholly due to his own transcendent genius.

THE modern architect who, touring abroad, gratefully recognizes the chicken under the name of "Sudden Death," so short a time before it appears on the broiler was it gaily running about, and who recalls with derision the ancient advice to sacrifice a cock to Æsculapius, may after all have genuine reason to rejoice that so many men and women pursue the gentle pastime of counting chickens before they are hatched. That nearly imbecile Gallina should be the cause of a discovery of much possible value to architects seems wholly laughable, and yet, after all, the "cock that crowed in the morn" really had something to do with "the house that Jack built." It seems that our own Department of Agriculture, listening to the lamentations and petitions of innumerable raisers of poultry that it should discover some way of preventing the too speedy rusting of the wire fencing, of which so many miles are used in controlling the wandering propensities of the secularly useful fowl, has been conducting experiments, under Dr. Cushman, which have resulted in discoveries and the propounding of theories of the most unexpected nature and of far-reaching effect, and these theories are said to be accepted by "the leading specialists in this field of investigation."

WE will not attempt to give a proper technical account of Dr. Cushman's discoveries, as that is quite beyond us, but he appears to have disproved the theories hitherto entertained as to the rusting of iron, and to have shown that in place of oxygen's being the active principle of rust, it is an ion of hydrogen that is the source of mischief, though each of these elements acts through the agency of the carbonic acid contained in the air and the moisture that is capable of furnishing both oxygen and hydrogen. Further, the experimenter has seemingly established the fact that the action on the metal is electrolytic in its nature, and, having decided this, the next step naturally was to reduce the metal to an inert or negative condition so far as relates to hydrogen. Dr. Cushman, by experimenting, discovered that "active *oxidizing* agents, such as the chromate and bichromate of potash, prevent rusting by polarizing the iron and reducing it to the condition of an oxygen electrode," when it can no longer be attacked by the hydrogen ion. If this brief and imperfect statement may cause those to smile whose knowledge of chemistry and electricity is profound, we can only take shelter behind the greater knowledge of the "leading specialists" and express our belief that, at length, a very good start has been made on the path that will lead to a practicable method of permanently preventing the rusting of structural metal-work, and that it seems to be all the more hopeful, seeing that it is likely to lead to a method of also eliminating the electrolytic action due to wandering currents.

THE Art Commission of New York recently found reason to disapprove the plans submitted to it for a bridge which should cross from the mainland to Long Island in the neighborhood of Hell-Gate, so as to accommodate the traffic of the Pennsylvania and the New York, New Haven & Hartford Railroads. The bridge, as to its engineering features, was designed by Mr. Gustav Lindenthal, a few years ago Commissioner of Bridges for the city of New York, who, as in the case of the Manhattan Bridge, showed his good sense by asking Mr. Henry Hornbostel to attend to the architectural treatment of the structure. His choice seems to have been unfortunate, for, just as in the case of the Manhattan Bridge, where the treatment prepared by this architect has been displaced in favor of that devised by Messrs. Carrère & Hastings, so here it is his non-success that seems to have been the cause of the Art Commission's expressed disapproval, as it has led them to say: "It has been attempted, however, to give decoration to the towers and to the bases of the towers. This attempt has not, in the opinion of your committee, been satisfactory from an artistic point of view." To say this was right, proper and very probably necessary; but it seems to us distinctly regrettable and improper that the report should go on to say: "Your committee cannot approve of these decorative features, as they would have been ready to approve a strictly utilitarian construction." It has been our belief, shared, we imagine, by most people, that Art Commissions were established very largely, if not mainly, to prevent the erection with public funds of "strictly utilitarian constructions." That for one thing and for another, their words, if they mean anything, are clearly an invitation to the engineer to abandon all attempts at beautification, to revert to the strictly utilitarian, and, under the pledge of approval here given, to inflict on New York one more of the hideous bridge structures that American engineers have produced in such quantities. Of course, the Art Commission does not expect or desire this result, and fortunately Mr. Lindenthal is a man of too much sense to take them at their word, as he must feel confident, as we do, that Mr. Hornbostel can amend his design so as to satisfy feelings and opinions that must be satisfied.

Reinforced Concrete Building Construction[1]—III

PROF. LEWIS J. JOHNSON.—I am not often inclined to disagree with Mr. Worcester, but I think there is something to be said on the other side of this question of continuity of reinforced concrete beams.

The question seems to be, Shall we or shall we not count on continuity in the design of slabs, beams and girders? This question proceeds upon the assumption that it is beam action and not arch action which is to exist. This assumption is almost universally adopted and is doubtless correct, unless in cases where ratio of depth to span is exceptionally great. More attention is likely to be given to this question of arch action than has been given to it in the past. But, granting beam action to be the proper basis of design, I cannot see how any one can doubt that it is continuous-beam action that should be provided for. Slabs, beams and girders are continuous beams as built, and for better or for worse are going to act as continuous beams if they act as beams at all.

Objection to recognizing this fact in design seems to be based upon the supposition that designing beams as continuous would lead to mid-span sections good only for positive bending moments of about 1-40 wl^2, a figure which would be nearly correct for a load distributed uniformly over all spans at once, but would be fatally in error in the case of the far more probable instances of unequally distributed load.

Objection of a similar sort is applicable to design upon the basis of discontinuity, where ultra-cautious design for a mid-span bending moment of $\frac{wl^2}{8}$ is accompanied by a more or less complete ignoring of the negative bending moment of the supports. The assumption of simple beam action may thus prompt serious error on the side of danger quite as certainly as similarly present is beam action at all, it is continuous-beam action, That trouble from this source has not been more abundant I believe to be due partly at least to the undoubtedly considerable tensile strength of the concrete in the wings of T-section beams and girders. But if it is not safe to count on tensile strength of concrete elsewhere, it is not safe to count on it here.

The logical course to pursue is to recognize that, if the action present is beam action at all, it is continuous-beam action, and to design accordingly. This means careful attention to the extreme values of the flexures at supports as well as at mid-spans due to all possible distributions of the live load. The end sections are then designed to meet these extreme conditions, and so are the mid-span sections. This is standard practice among the Germans and Swiss, and it ought to be in this country, and I believe is going to be. Of course in applying this method, as in any careful design, attention will be given to all important facts, such as stair or elevator wells interrupting the continuity in places; and in cases of doubt, assumptions unmistakably on the side of safety will, of course, be made.

The labor involved in these computations is not so great as it would seem. As a matter of fact, the extreme conditions under uniformly distributed live load will almost always be covered in case of a series of beams and slabs of equal spans by designing for a live-load flexure of 1-10 wl^2 (l being measured from center to center of supports) at the faces of columns and girders, and the same amount at mid-spans; and this, too, regardless of the number of spans in the line. At the column faces flexure would be negative and at mid-spans positive, and in both cases would, of course, be combined with the dead-load flexures. If the spans are short and the live loads large in comparison to the dead, top reinforcement may be required at mid-span to provide for resultant negative flexures there existent.

The similar extreme values for girders subject to concentrated loads have not been so well established, but the need of them is recognized and it is hoped that they may be forthcoming soon.

If a designer prefer, let him use 1-8 wl^2 at the mid-span section, but let him not fail to provide fully for the bending at the faces of the supports.

He must not overlook the fact that top reinforcement over supports is as logical a requirement as bottom reinforcement at mid-span.

Moreover, there is additional justification for top reinforcement in that it is of the greatest possible value in case of weakening of bottom rods by fire. The top rods through cantilever action may carry the load after the lower rods, in the far more exposed position of the two, have failed. In fact, top reinforcement does not seem to have had the attention to which its merits from the fireproofing standpoint would seem to entitle it.

It may be objected that continuous-beam coefficients based upon the assumption of unvarying moment of inertia may be inapplicable to reinforced-concrete beams. This is certainly a fair field for research, but the practitioner may well proceed for the present with his 1-10 wl^2, taking comfort from realizing that the negative bending moment over supports would not rise above $\frac{wl^2}{8}$ even in the extreme case in which the moment of inertia becomes zero at mid-span—the case of two abutting disconnected cantilevers—a case most unlikely to occur. The error in the 1-10 wl^2, if any exist, must be extremely small and unimportant.

For beams under a uniformly distributed load, the top steel at the column faces and through the column may or may not be the same in amount as at mid-span, depending upon the relative depth of the beam at the two points, but I see no escape from the belief that the negative moment of resistance at the column face should be as large as the positive moment of resistance at mid-span. If, as is usual, floors are figured with T-sections, this may call for the German practice of materially deepening the stems at and for considerable distances each way from the supports, to make up for the absence of flanges on what is here the compression side of the beam.

This leads to brackets at connections of girders to columns and of beams to girders. These brackets complicate the forms and are usually unsightly. They can be obviated by making depth of stem at mid-span as great as required at the column faces, proportioning bottom steel at mid-span accordingly. This interferes with head-room and adds to the quantity of concrete required. It may in some cases be practicable to diminish this depth by use of steel reinforcement in the compression lower side of the beam at the support. Though this latter reinforcement would also be effective and necessary reinforcement from the arch point of view, the brackets will in many cases be preferred to either of these alternatives.

But continuous-beam action, I believe, is with us, and with us to stay; is, in fact, unavoidable. It must be reckoned with and patiently and properly provided for in all reputable reinforced-concrete practice. Above all things, let us here as elsewhere adhere to the policy of preparing at all points of a structure for the most unfavorable conditions reasonably to be expected. And, finally, let us not go on imagining that we err on the side of safety when we ignore continuous-beam action.

Turning now to what I came here to say, I wish to place on record some very high and perhaps unprecedented values for unit shears and unit adhesion stresses. These results were obtained in the beam tests of which I had the honor to give you some preliminary account last May. They are results obtained in the actual working conditions of a beam, and computed, as seems clearly proper, by the same methods which one should use in designing a projected beam or girder.

These results were gained from beams 3 in. wide, 9 in. deep over all, and 8 ft. long. The steel reinforcement was 8 in. from the top of the beam, and the amount in all cases was 1 per cent. of section above the steel. The rods included smooth round, cold-twisted square and Johnson corrugated. The Johnson rods were in all cases perfectly straight, but the others were some straight and some hooked up about 3 in. at ends, and some of the smooth round rods had each end bent around a short piece of 1.125 in. rod, which thus formed a somewhat loose anchor. In no case was there an anchor-plate or washer.

A slip sufficient to break an electric contact rang an alarm-bell and the behavior of the rods as to slip was thus carefully watched.

Two grades of concrete were used; one was of proportions 1:2:2 2-3, the stone being scaly trap; the other, 1:2½:5, the stone and sand being in this case of a character to permit a leaner

[1] An informal discussion before the Boston Society of Civil Engineers at its meetings held September 19 and October 5, 1906, published in the "Journal" of the Association of Engineering Societies for June, 1907, here continued from page 46, No. 1650.

mixture. The two grades will be referred to as rich and lean respectively.

In all, twenty-five tests of this kind were made, nineteen of them on rich beams and six on lean, and as might, perhaps, be expected, failure was due *in every case* to slip of the reinforcement, regardless of the kind of rod and the conditions of the end. Consequently the actual shearing strength of the concrete was never realized, and the values given are merely the values of the shearing stress in existence at the time when the adhesion gave out. In none of these twenty-five tests were there stirrups or diagonals or other web reinforcement.

The shear thus developed averaged, in the six tests of lean beams, 470 lb. per square inch, with extremes of 573 and 233; average age, 143 days; age of extreme values, 138 days for smaller, 137 days for larger.

The shear similarly developed in the nineteen tests of rich beams averaged 628 lb. per square inch, with extremes of 750 and 488; average age, 50 days; age of 53 days for the higher value and 50 days for lower.

All of these values may, of course, be taken as horizontal or vertical shears indiscriminately. Considering that these values were in no case ultimate values, and considering that bending stresses were by no means excluded, these results add to the evidence now steadily and convincingly accumulating that the actual shearing strength of concrete has been greatly underestimated. They confirm the growing belief that failures have been attributed to shear that were due to slip of rods or diagonal tension, phenomena closely connected with shear, but still should not be called shear.

The adhesion stresses developed in the six tests of lean beams averaged 774 lb. per square inch, with extremes of 970 and 427 lb. per square inch. The 970 figure was for a perfectly straight unmodified cold-twisted rod in a beam of 137 days old. The 427 for a similarly unmodified smooth round mild steel rod, this last a figure about twice what is usually expected of such rods.

In the rich beams the average of adhesion stresses in the 19 tests was 1,094 lb. per square inch, ranging from 913 for a smooth round mild steel rod with ends hooked up, through 960 for a similar rod without the hook, to 1,367 for a similar rod bent around an 1.125-in. anchor-rod.

The results in detail for lean and rich beams, together with the values of "A" [the distance between the point of support and the nearest end of the beam] in each case, are as follows:

TABLE I

Kind of Rod and Condition of End	Lean Beams		Rich Beams	
	f_a Lb. Per Sq. In.	"A" in.	f_a Lb. Per Sq. In.	"A" in.
Rods Straight and Unmodified:				
Smooth round mild steel.........	427	4	......	...
Smooth round mild steel.........	......	...	960	7
Smooth round mild steel.........	......	...	1,194	17
Johnson corrugated..............	......	...	1,182	7
Johnson corrugated..............	......	...	1,232	9
Cold-twisted square.............	853	4	......	...
Cold-twisted square.............	970	4	......	...
Cold-twisted square.............	......	...	1,073	7
Cold-twisted square.............	......	...	1,155	9
Cold-twisted square.............	......	...	1,161	15½
Cold-twisted square.............	......	...	940	12
Rods Turned Up at the Ends:				
Smooth round mild steel.........	790	4	......	...
Smooth round mild steel.........	......	...	1,266	7½
Smooth round mild steel.........	......	...	893	6
Smooth round mild steel.........	......	...	913	6
Cold-twisted square.............	854	4	......	...
Cold-twisted square.............	753	4	......	...
Cold-twisted square.............	......	...	1,178	6
Cold-twisted square.............	......	...	1,185	6
Cold-twisted square.............	......	...	936	4
Cold-twisted square.............	......	...	1,102	6
Rods Turned Around at 1.125-in. Anchor-rod				
Smooth round mild steel.........	......	...	918	6
Smooth round mild steel.........	......	...	088	6
Smooth round mild steel.........	......	...	1.135	5½
Smooth round mild steel.........	......	...	1,367	6

Hardly less striking than the high adhesion values in all these tests are their comparative uniformity regardless of differences in types of rods and end conditions, and the unimportant difference between the results for smooth and deformed rods. In fact, the last beam of the series would suggest that by a very simple and natural modification smooth round rods may surpass their more pretentious and energetically advertised rivals.

But it must not be forgotten that the conditions in these tests were of an extreme nature, and the inference must by no means yet be drawn that such high results are to be expected under other conditions of loading. These peculiar conditions may include something which would render the method of computing f_a inapplicable, but it is hard to suggest just what it could be. It would seem that such abnormally favorable action as might have been present in these tests would be equally likely to be present in an actual building under similar loading conditions. Possibly a vise action as result of compression of the concrete on the under side of the beam at the support due to the very high end reactions and consequent gripping of the rods may have been in operation, but if this had been the case one would hardly suppose there would have been so great a disparity between the results for the lean and the rich mixtures. The lean would be likely to deform more and lead to a tighter grip, but yet the results do not substantiate this view at all.

More plausible is the suggestion that even with this load, unfavorable as it was for producing deflection, the beams were sufficiently bent to interfere materially with slip. This, however, is a condition of practice, and nothing to invalidate the results from a practical point of view.

It should also be stated that with other and more usual conditions of loading, slip occurred with considerably lower values of f_a than the ones above given.

Whatever the value of adhesive stress actually developed in these 19 rich beams, the fact remains that the ***ultimate*** strength of the 9 of them which were reinforced with smooth round rods ranged from 4.5 to 6.5 times what our customary methods of figuring and ultimate stresses would have led us to expect.

And whether the adhesion stresses as given are correct or not, the 25 beams do afford a fair basis of comparison between the two mixtures of concrete as well as of the rods and their end conditions. What I have called the lean mixture is not believed to be an uncommonly lean one from the point of view of ordinary American practice, and that I have called rich is probably not so rich as the common European mixture as used by the best practitioners. Yet the difference between these two mixtures is striking. The rich concrete results showed 42 per cent. higher average for f_a than the lean, showed very much less variation from the mean, and furthermore were obtained at scarcely more than one-third the age. It is noticeable that the disparity between the smooth round rod and its rivals is vastly greater in the case of the lean concrete than in case of the rich, as was to be expected.

If arch action was the prevailing condition, the advantage in favor of the rich mixture is not so clear as otherwise, because, with the rich mixture the "A" was almost always greater than with the lean.

The nearest recorded approach to these results for f_a, so far as I am informed, are those of Kleinlogel, described in ***Beton u. Eisen***, 1904, page 227. His beams were of 1:1:2 mixture, reinforced with smooth round rods absolutely unmodified or bent, without stirrups or mechanical anchorage. The span was 6 ft. 7 in. and the beams were loaded at the quarter points. Size of beams was 6 by 12 in. Age not clearly stated, but was not less than five (5) months. His maximum f_a was 550 lb. per square inch (an average of a set of four beams just alike), and *was not an ultimate value*, but like the shear values above recorded merely values realized when failure occurred some other way. The percentage of steel was 0.094. In Kleinlogel's case the failure was due to stretch of the steel between the supports and subsequent crushing of the concrete. The portion of the beams outside of the loads showed no sign of failure whatever and the adhesive strength had clearly not been reached. It is easy to believe if his beams had been loaded as were the ones in Cambridge, failure by bending would have been deferred until f_a reached as large values as those I have given. His maximum value of shear, f_s, was 470 lb. per square inch, and failure in this case was attributed to diagonal tension.

Kleinlogel attributes considerable importance to the deflected condition of the beam (carrying with it, of course, a slight bend in the rods) as increasing the f_a and, very properly I think, deprecates the customary attempt to reason from results from straight pulls of imbedded rods out of blocks to the resisting power of a rod in actual service in a beam.

Professor Talbot's maximum value for unit adhesive stress upon smooth round mild steel rods in his series of 1905 was only 193 lb. per square inch, but this was not an ultimate value, for failure was to be attributed to causes other than slip. His loads

were applied in a way not intended to develop extremely high values of V, while in the Cambridge beams just described of course high values of V were deliberately sought.

These very high values of adhesive stress and shear are presented for record and discussion and I cannot make it too clear that I believe the high adhesive results, at least, may be due, perhaps must be inseparably connected with, the very exceptional method of loading and should by no means be taken as a basis for design until further investigations are made. Either the results are valid as they appear, however, or there are circumstances in which the customary methods of figuring do not apply; if the latter, the reason is yet to be sought. The promising direction for the search, in my opinion, is arch action.

However all this may be, the tests certainly do encourage the hope that richer mixtures will remove much of our reasons for fear of adhesion or shear failure.

So far as verticals or other web reinforcement are concerned, there are results from other beams of that series of tests which have come to light since last spring which are worth reporting briefly at this meeting, pending more detailed publication later. They are as follows:

Some 60 to 70 of the beams of the lean mixture were loaded at the quarter points in a span of 88 in., making the space between loads 44 in. The size and amount of reinforcement the same in general as in the 25 beams loaded as before, except that about half of them had web reinforcement either vertical or diagonal. The vertical consisted of so-called U-bars or stirrups, and pairs of disconnected straight rods thrust into the concrete after filling the moulds, the U-bars and the pairs spaced 6 in. apart measured along the beam. The diagonal consisted of Kahn bars with their wings as well as the bent-up (Hennebique fashion) portions of the main reinforcing rods, in that case smooth round rods.

The rods included round and square smooth rods of low as well as high elastic limits, Johnson corrugated, cold-twisted square, and a variety of end conditions, turned-up ends, nuts and loose washers and ends turned around anchor rods.

In the beams with vertical reinforcement the main reinforcement included all those enumerated in the preceding paragraph, but in those beams the main rods had ends with no modification. The special anchorage of the main reinforcement was in no case combined with vertical reinforcement.

From these 60 or 70 lean beams it appeared that on the whole the best showing, so far as postponing the "first crack" (I mean visible crack) is concerned, came from beams with no web reinforcement whatever, either vertical or diagonal. The rods in some of the best of these cases had nuts and washers at the ends, and the very best had the rod ends turned around another rod. But it is not clear that end conditions were the determining influence, for smooth round rods with nuts and washers were surpassed in cases by similar rods perfectly straight and unmodified. There seemed to be no advantage in high elastic limit over low.

For ultimate strength in the same set of lean beams. the best results come with the web reinforcement, with smooth round rods with nuts and loose washers without web reinforcement a good second.

Unfortunately the rich beams loaded at the quarter points were only five in number, reinforced respectively with smooth round mild steel, smooth square mild steel, smooth square high carbon steel, Johnson corrugated and cold-twisted square, *all* (deformed rods and all) with a nut and loose washer at each end.

The twisted rod led to the highest first-crack result of all, higher than the very best of the lean beam results, and all four others closely bunched alongside the best of the lean beams, with the smooth round rod a little ahead of the remaining three.

The highest ultimate results from this lot of five rich beams came from the high carbon (elastic limit, 71,200), closely followed by Johnson corrugated, next the smooth round, and the twisted square, and worst of all the square untwisted mild steel rod; all rods, be it remembered, had nuts and washers at the ends.

The two best showed much higher ultimate results than the best of the lean mixture, though the latter had web reinforcement and the former did not. The next two were about even with the very best of the lean mixture, and the worst of the five was surpassed by only few of the lean beams. The rich beams were about 103 days old and the lean 150 to 175 days old.

All this would tend to show that a rich concrete, or straight rods with nuts and washers, or both, is the most hopeful means of getting the best results both from point of view of the first crack and of the ultimate strength, and that web reinforcement, whether vertical or diagonal, is comparatively of doubtful utility from these points of view. In lean concrete the verticals at least seem to tend to uniformity of strength, and to slower, more gradual failure.

And it should be carefully borne in mind that the washers used in those tests were the small, thin, standard washers and not secured against the nut except by the concrete as it was packed. Useful as such washers proved, they did not altogether prevent slip except with the round smooth bar, and I believe they would have shown better results still if they had been larger, thicker and secured against the outer nuts.

Richer mixtures than customary, and more carefully designed plate end-anchors and common round rods will accordingly be my next line of study.

I heartily agree with Mr. Wason's plea for uniform figuring of working loads, and I also want to urge the propriety of the general adoption in this country of the practice of the Germans in using what I haven't used until within six months myself, but I am now convinced it is best—and that is a straight line distribution of stress with a ratio of 15. This is a practice thoroughly established in Germany and it gives, as a matter of fact, results almost absolutely identical with the parabolic distribution with a ratio of 10 such as I used to use.

Another point I have had forced on my attention lately is what we want for a factor-of-safety. That is a question that has not been asked to-night, but I think the factor-of-safety a good many times is lower than stated. It seems to me that we ought to insist on a factor-of-safety of 2.5 against the first crack. I think that is a good place to stop—2.5 for the first crack and 4 or 5 for ultimate. The first crack seems to be a pretty serious matter.

Urban Planning[1]

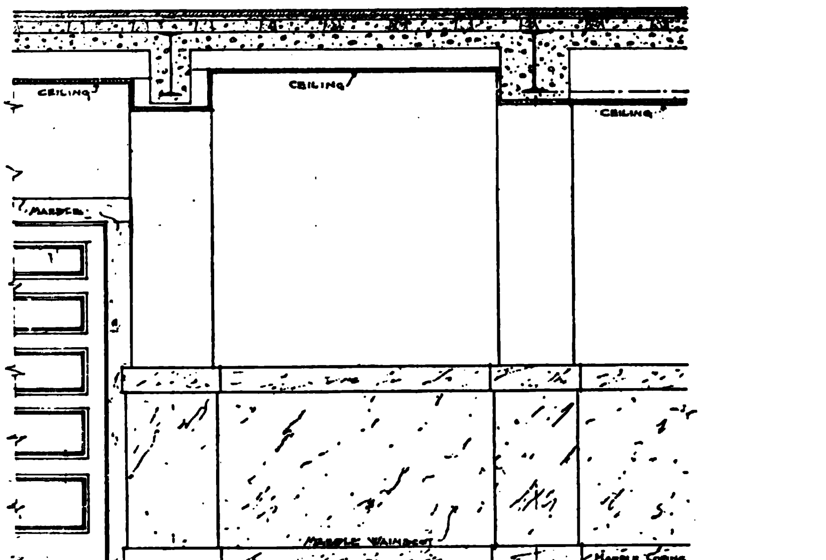
THE first main distinction between Parisian methods and ours is that in Paris all schemes involving in any way the beauty of the town whether they be for the laying out of new streets, the drafting of new building regulations, or merely the decoration of some public building, are reported on by specially appointed commissions of experts, assisted by the permanent officials. It has become an honor for any artist, whether he be an architect or painter or a sculptor, to serve on these commissions and give freely and without remuneration the best of his ability to the public service. For instance, the Paris building laws were revised in 1896 on the report of a commission which consisted of the following persons: Two municipal councillors, the official who corresponds to our building surveyor, the chief of the department which deals with building lines, the chief engineer, the chief inspector, and the honorary architect to the town of Paris—that is seven official personages. So far it might have been an English departmental committee. But here is the difference; in Paris sixteen other outside architects of distinction were added so as to ensure to the town the best ability, which is not generally willing to submit itself to the trammels of an official position. Such a commission, it will be at once seen, would possess enormous weight. It dared to legislate on many other matters beyond those affecting the health and safety of the public. It imposed a large number of restrictions on buildings which we have not arrived at in England, but it did them with knowledge of the effect to be produced. To take an apparently small matter, but one which has been large in the result. As in Edinburgh and London, though not yet in Liverpool except for domestic buildings, the limiting height of all buildings in Paris is proportioned to the width of the street, but in addition to that the roof is to be

[1]Extract from a paper by Professor Reilly, Director of the Architectural School at the University of Liverpool, read at the "City Beautiful" Congress held at Liverpool, June 27, 1907.

contained within a quadrant of a circle of given radius. The result of this simple regulation has been to bring about a striking uniformity of roofs, which is most important to the regular and monumental appearance of a street, for in a wide thoroughfare it is the masses of roof seen against the sky which are the dominating features of the facades. The Avenue de l'Opera and Rue de Rivoli are good examples of this. Another by-law, more strictly dealing with projections over the public way, has led to the flatter and quieter treatment of town fronts which is so characteristic of a French town. But granting the existence of such a commission as I have related above it is possible for the municipality to exercise a much greater control over buildings than it exercises already, and to definitely prohibit buildings of bad design, as well as to encourage good ones.

In Edinburgh, where the Guild Court, which is largely composed of architects, controls all building operations, the designs for the exterior of buildings about to be erected have to be submitted for approval, together with a statement of the materials to be used. Edinburgh can thus control the appearance of its streets in a way neither Liverpool nor indeed any other English town can. But Brussels and Paris go much farther than this. When a new street is to be opened up they offer definite encouragements to good building by awarding prizes for the best designs for buildings about to be erected in it. Paris even not only gives a prize to the architect, but gives a remission of part of the street tax—that is, of the rates—to the owner of the building. No such direct encouragement to build beautifully has ever been proposed, as far as I am aware, in England, nor would it be much use unless we accepted the system of trusting the awards to juries of experts. In England the building by-laws are drawn up and administered by lay bodies, assisted by officials, who in most cases make no claim to be architects or to have an education in the fine arts.

But if this question of expert advice is necessary in dealing with the details of buildings how much more necessary does it become when a big improvement scheme is projected. For, consider what the cutting of a single new street in a town involves, in addition to the sewering, the lighting, and paving, for which the borough engineers and surveyors are the proper authorities. The intersections the new street makes with every cross street mean important building sites, and the shapes of these sites determine forever the shapes of the buildings to be put upon them. Are they good shapes, conducive to beautifully-shaped buildings? For it is not a sound canon of architectural criticism to say of buildings, as was once humorously said of the University Buildings in Liverpool, that we greatly admire them but much dislike their shape. The ground plan of a building is its most important factor. Will the sites provided make balanced, symmetrical, dignified buildings? These are all questions, I submit, of a purely architectural character, and the City Beautiful of the future depends for its existence on the solutions arrived at, and as such they are as important as those problems of traffic and sewerage which have till now completely held the field.



SECTION THROUGH SWIMMING-POOL: Y. M. C. A. BUILDING, ARCH STREET, PHILADELPHIA, PA.

Horace Trumbauer, Architect.

We are having at this very moment in Liverpool a striking example of the simple disaster which follows the neglect of these questions. The famous George's Dock sites are, it will be admitted, among the most important in the town. They stand at its very gates, and a worthy treatment of them should have the town's first care. Yet the shape and size of these three sites have been determined solely by the carrying through to the river front of Water Street and Brunswick Street, regardless of the fact that the sites so left are of most unequal size and shape. This being so, we are beginning too late to realize that we can never have a balanced composition of the three buildings such as the position demands, and it is consequently rather useless now to complain of one building being higher than the rest. Again, there being in existence no architectural scheme for the whole, we find the Dock Board on one of the *end* sites putting up a building with a very dominant dome, led up to by lesser ones, which is essentially the type of building to form the center of a composition, not one of the wings. I do not know in this case what difficulties, if any, there were in the way of laying out these sites in an architectural manner. If, for instance, it were necessary for Brunswick Street and Water Street to be taken through, why the buildings on the river front could not have been carried over them on arches or by a colonnade; but whatever the difficulties, I feel in France a proper solution would have been obtained even at the cost of a short Act of Parliament. The best architecture can now never make a success of these sites, though beautiful materials and good details may alleviate the disaster.

In London we have recently had an example of the opposite method of dealing with town property—the French method, if I may call it so, though it was the English method, too, from the time of Wren till the end of the eighteenth century. The Crown, in dealing with its Piccadilly and Regent Street property, has formed just such an advisory committee of artists as is com-

missioned in Paris. Two leading independent architects, Sir Aston Webb and Mr. Belcher, were asked to form a committee to join Sir John Taylor, the official architect, in advising the Crown. The result has been that after a century of individualism we are to have once again a complete scheme of harmonious architecture from one end of Regent Street to the other.

Perhaps enough has been said for the establishment of advisory committees of artists. When once established, and if the municipality at its back is endowed with sufficient power, everything becomes possible. To begin with, an ideal plan of the city—ideal only in the sense that it is waiting to be realized—such as Washington and Boston already possess, should be drawn up, towards the ultimate realization of which all improvements should lead. If Wren's for London after the great fire had been adopted how many expensive latter day improvements would have been forestalled. As in Berlin certain districts could be set apart for certain purposes. The development being no longer haphazard the character and consequent value of districts could be maintained. Just as much or just as little variety as the district requires could be allowed to buildings, and not only buildings and streets, but whole districts could be made parts of one harmonious composition. But the possibilities are endless. The one thing necessary for a city, as for an individual, is to have faith, and all else is added to it.

Black-and-White[1]

THE discovery of photogravure has had in two directions an influence on black-and-white art. It has encouraged direct pen-drawing as counter-distinguished from the etching of an earlier day, and almost transformed its character. Pen-drawing has of course always existed; we find numerous examples of it among the Italian masters, though (for the reasons which were explained above) with these it is rarely naturalistic. Rembrandt practised it; but for his own behoof, not as a "public" art. Until the invention of photogravure (this, too, was in the sixties) there were no adequate means for reproducing such work. The other form of black-and-white art which has been directly influenced, almost created, by the new "processes," is drawing by washes in ink or Indian ink. There were no means of reproducing these, and so using them in illustration, until photogravure was invented.

Devotees of any particular branch of art may be expected to exaggerate its merit, and it need not surprise us to find Mr. Joseph Pennell, who is not only a writer on pen-and-ink drawing but himself an accomplished draughtsman after this kind, speak as we have seen he does about the "color," the atmosphere and so forth which masters such as Fortuny and Vierge bring into their pen-drawing. It is natural, too, that he and the special admirers of this work should persuade themselves that it is for the first time realistic. This pen-drawing stands on a different plane from the quasi-realistic etchings of an earlier age. These were subject to certain formulas. Our modern pen-draughtsmen, Vierge for instance, and Mr. Pennell himself (save in so far as he is to be reckoned a mere follower of Vierge) seem to have invented new ones. Their work has a capacity for suggesting wide spaces such as was unknown of old; they have a gift, one may say, of utilizing the unused parts of their sheet. Nor must Gustave Doré be forgotten in this connection: a wretched painter who gained a reputation from the ignorant, he had as a black-and-white artist a good deal of originality precisely in this direction, in the utilizing of blanks, of masses of white or masses of black. With Vierge comes in another element of which we have not yet spoken—the decorative sense. The black priests who officiate in Vierge's processions, the lightly sketched figures looking on, these are contrasted as they could not be in real life. We are then in presence of a new convention: used with what object? To give in the first place a sense of distance contrasting very literally *toto cælo* from those pre-Raphaelite illustrations wherein no atmosphere is found. This is their first object, the second is mere decoration and the distribution of black and white. Let us note, too, the extraordinary deftness of these Spanish masters in pen-drawing, of Vierge, of Fortuny, and of those who have been much indebted to their example, such as Mr. Pennell, which gives to their achievement a separate and æsthetic charm. Yet it must in candor be owned that among modern black-and-white work there is little that is more conventional than theirs.

The average reader of illustrated papers would not probably derive much æsthetic pleasure from another master of pen-and-ink, Caran d'Ache; nor would it appear why a draughtsman whose work appears so rough should be mentioned by the side of these delicate and courtly Spaniards. In the essence, Caran d'Ache's work is anything but rough. His subjects are rude and comic; but few draughtsmen have ever expressed more by the line than he has expressed. Thus the wit of his illustrations lies almost wholly in the draughtsmanship; just as the wit of our most popular caricaturist, Sir F. Carruthers Gould, lies anywhere else but in the drawing, which as drawing is of the worst. Caran d'Ache is supreme when in the simplest outline he gives us a pageful, a whole series of heads, some twenty different types maybe; possibly national types, convincing at the first glance, and yet often far from what we should have guessed beforehand.

As regards one quality spoken of anon—mere decoration—the distribution of black and white in a picture—we have to reckon with a new development of taste derived, as would appear, from the Japanese. From them we have learned the value of the simple balance and arrangement of things. If a Japanese had to place upon a table an inkstand, half a dozen pens, a house-key, a ball of string and a pocket-knife, he would contrive so to distribute these articles that the eye would gain satisfaction from the result. And so with drawing, with the distribution of lines, of masses of black and spaces of white. It is not a very high order of intellect which can gain great pleasure from these arrangements. But it requires a certain artistic sensibility to do so. And just in our time, when special efforts have been made to sequester the artistic sensibilities, to deny any share in them to the toilers and spinners of the world, it is natural that a sort of art should be valued which these artistic sensibilities can appreciate, while it makes the least possible demand upon other intellectual powers. A great deal of black-and-white work, among it some of the types of pen-drawing which we have just spoken of, has profited by the development of this new taste in ornament. The apotheosis of this taste is to be found in the work of Aubrey Beardsley and his imitators: the most unintellectual type of black-and-white production which perhaps the world has ever seen. There was in Beardsley's work also the affectation of a peculiar and individual hideousness in the human forms which he portrayed—if, indeed, they can be called human—which no doubt served the purpose of giving to his admirers a feeling of distinction in the fact that they could see beauty in what to the common man was so hideous. The forms also (let us in fairness confess) have caused both to their author and his followers a more legitimate pleasure of association; for they at once recall the demons on Japanese pictures in colors or in black and white, and in Japanese metal-work. Now almost all Japanese work gives pleasure to the æsthetic sense; but it gives pleasure in spite of, not through, these hideous presentations. In the same way, we may admit that Beardsley's work gained and earned a more legitimate admiration for its deftness and its one great quality, its skill in constructing with a minimum of effort a mere pattern out of black and white. And Aubrey Beardsley has had his direct imitators, not to speak of a much larger number who have been subject to the same kind of influence which affected him—a something in the air. Thus in Germany, and especially in Munich, there has been a whole school of black-and-white artists who have been preoccupied as much as anything, apparently, to get a harmonious pattern on their paper, regarding it partly as if it were in truth a wall-paper. We see specimens of this kind of work in the German comic journals—in *Fliegende Blätter*, in *Kladderadatsch*, or *Simplicissimus*. Sometimes it is a Gothic pattern that the author aims at; yet we may guess that even to him the moving influence has come from Japan.

The extreme of this taste (to give it that word) is found in the French painter Gauguin, who made a public profession that the only art worth studying was that of the Fijians, and who produced both in oils and in black-and-white what seemed to be meant for pictures in closest imitation of his exemplars. Most

[1]Extract from a paper in the "Edinburgh Review" for July.

savage people have in a lesser degree that capacity which distinguishes the Japanese, the gift of arranging harmonious patterns. So that if the mark be to provide the absolute minimum of intellectuality in any form of art, along with some pleasure to the esthetic sense, that mark has been hit by Gauguin.

Of quite another sort is the production of those who work or have worked in washes, that band of joyous and delightful illustrators whom most of us know best and best appreciate when they are engaged with such a worthy text as Daudet's incomparable "Tartarin." J. Girardet, Montégut, De Myrbach, Picard, Rossi are the names of those who collaborated in that special work, among whom De Myrbach and Rossi are the best known.

Widely as all these different productions differ among themselves, it is yet possible to indicate a general current along which all or almost all our art work is being borne at this epoch of time. Work in black-and-white submits to the same influences that have affected painting. Two things seem to distinguish modern art, taken as a whole—its sensitiveness and its unintellectuality. The former is in some fashion the counterpart of the latter. Most modern artists would triumphantly accept the charge of being non-intellectual; only they would translate it into another phrase—non-literary. It is the boast, in many regards the legitimate boast, of modern art that it is not literary, that it does not confound two different arts, that it does not tell stories in its pictures, nor appeal to the vulgar emotion of simple curiosity. And it would claim to be much more sensible or sensitive than was the art which immediately preceded it to those emotions which rightly belong to art, to fine tones of color, to harmonies, to all the elements that distinguish real impression got from outward objects, from what we "know" concerning them. We have seen how modern black-and-white has upon its side freed itself from many bonds which came from literature, has freed itself to a large extent from that tyranny of the line whose title rests much more on its aptness in the giving of information than in the gratification of an artistic sense. One cannot say but that this is a good, if this were all: what is not so good remains behind. For often this artistic sensitiveness degenerates into a sort of hysteria, a sort of delight in all that is intellectually stupid, because it is therefore not outside the regions of art; and then, passing over as hysteria does to the opposite of its first state, it turns into a pleasure in insensibility, in coarse blotchings, in fantastical ugliness and all other kinds of tomfoolery, such as we find in Beardsley and his school.

For the "unintelligence" of modern art, however, that is not so much its special characteristic: it but sadly reflects the unintelligence and unintellectuality of modern life generally—of modern society, which is marked by a decadence in almost every branch of literature. In that field, in place of the greater histories of an earlier time, works which were literally monuments, it gives us "treatises" or handbooks; or else those gossipy, half-informed volumes of which the libraries are full. In the sphere of fiction it has kept us stationary or retrograde, practising a bygone mode beside other nations who are reaching forward to and grasping new fashions of the art; and it has made poetry in England a neglected and a negligible thing. This unintellectuality is reflected likewise in art; and, with all other branches of it, the art of drawing in black-and-white.

ILLUSTRATIONS

Y. M. C. A. BUILDING, ARCH STREET, PHILADELPHIA, PA. MR. HORACE TRUMBAUER, ARCHITECT, PHILADELPHIA, PA.: SIX PLATES.

HOUSE OF MR. HAMILTON, 1745 JEFFERSON AVE., DETROIT, MICH. MESSRS. STRATTON & BALDWIN, ARCHITECTS, DETROIT, MICH.

PHIPPS HALL OF BOTANY, PITTSBURGH, PA. MESSRS. ALDEN & HARLOW, ARCHITECTS, PITTSBURGH, PA.

Additional Illustrations in the International Edition.

ENTRANCE PORCH: HOUSE OF MR. HAMILTON, DETROIT, MICH. MESSRS. BALDWIN & STRATTON, ARCHITECTS.

NOTES AND CLIPPINGS

An Over-sea Railway.—Some eighty miles southwest from the coast of Florida is the small coral island of Key West (*Cayo huesto*, the key or island of bones), once the resort of pirates, but now the site of the chief city of Monroe County, and the most important naval station of the United States. Between the mainland and this isolated spot extends the remarkable chain of islands known as the Florida Keys, about to be linked up by an extension of the Florida East Coast Railroad. The new line will be literally an over-sea railway, for many of the islands are separated by channels several miles in width. Some thirty miles south of Miami, the present terminus, the line passes for twenty miles through the Mangrove Swamps, where there is not enough water to float dredges, and not enough material at hand for the construction of embankments. It next enters a wide expanse of salt-water marshes, across which trestle viaducts are being carried, as the soil is not capable of supporting a solid roadway. About thirty of the islands are to be utilized for short sections of the railway, but after Key Largo has been passed none of them are of any great length, and fully seventy-five miles of the new railway will be carried across the sea. More than fifty miles of rock and earth embankment will be built in shallow water, and in places where the depth is more considerable and the channels are exposed to storms, owing to gaps in the outer coral reef, concrete viaducts will be built with arches of 50 ft. and 60 ft. span, supported on piers rising from the sea bed from 10 ft. to 30 ft. below the surface. Four such viaducts will be required, ranging from nearly a mile to more than two miles in length each. The longest of these viaducts is already in course of construction, some idea of its importance being given by the statement that it will comprise 217 arches rising to the elevation of 31 ft. above high-water level.—*The Builder.*

The Tower of St. Mark, Venice.—The committee of artists, architects and engineers which is superintending the restoration of the Campanile, Venice, has issued a report which includes the following items: The committee is perfectly satisfied with the choice of the building material and does not agree with the opinion of Professor Luscardo, which led to the interruption of the work. The brick selected is strong and durable in spite of the efflorescence which is produced by the sulphates it contains. The mortar also has the necessary properties, although the sand is limy and the cement contains, like all cements, a small admixture of sulphates. The report observes that although technically a chemically pure material is desirable, yet the beautiful weathering of brick in Venice is due to impurities in the material, which are not necessarily harmful. The second part of the report deals with the work already executed. The committee is thoroughly pleased with the foundations, which have been built with great care. Since the whole building is to be lighter, its base widened, and its greatest weight at the periphery carried by new ground walls, the pressure per square centimeter has been reduced from 10 to 4.3 kg., hence lessened by a half. The committee sanctions the use of ferro-concrete for the belfry and the steeple, as also the method of placing the angel on the apex. The third part of the report deals with the exterior of the tower. Venice is responsible for the catchword "Where it was, and as it was." The committee is of opinion that "as it was" does not mean that the accidental inclination of the building, the unequal base, the crushed, bad material and the patina on the old belfry shall be reproduced. The form will be the same old form; the material new, albeit matching the old as far as may be, but the evils wrought by time are not to be artificially supplied. Finally, the report sanctions the restoration of the five external steps up to the tower, only three of which remained visible owing to the sinking of the building. The Loggetta is to be built independent of the Campanile, which under favorable circumstances should be completed towards the end of 1909.—*The Builder.*

The Olympiad Stadium, London.—As president of the British Olympic Association, Lord Desborough on July 31 raised the first stanchion in the construction of the great stadium that is to be built for the fourth international Olympiad, to be held in London next year. The stadium will hold 70,000 spectators, besides having dressing-rooms and other accommodations for the athletes. The arena in which the games will be held will be 1,000 feet long and 700 feet broad and will have a broad cycle track of two and three-quarter laps to the mile. Inside this will be a running track of three laps to the mile. There will also be alongside the track a huge swimming-pool, with a deep space in the middle for high diving and water polo. It will be over 109 yards in length.—*Exchange.*

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IN spite of the fact that the average income of architects—of those at the top as well as of those at the bottom—is drawn from the pockets of men who are not classed among the owners of great wealth, every architect who is an artist has a very real interest in the continued gathering, holding and dispensing of "swollen fortunes," as they are called just now. The astounding amount of building undertakings, executed in the main in interesting fashion, if not always evidencing the highest skill in the arts of design, which the last dozen years have witnessed in this country, is not due to the high training of the architects, but merely to the opportunities that have been forced upon them, opportunities that were not within the reach of those who were architects to their fathers and grandfathers, and these opportunities are due to nothing so much as to the existence of swollen fortunes and the lesson only recently learned that really great undertakings can only be accomplished by combining financial resources and entrusting their handling to men of purpose and understanding. But it is not our purpose or our province to invade the field of economic discussion, though we wish it were, as there are many things we would like to say that might help to bring the people back to the understanding that, in spite of the assertions of many self-seeking politicians, the American business-man is not a scoundrel and pirate, and that if he has now a "swollen fortune" he gained it, in nine cases out of ten, by practising the methods of mercantile life in accordance with the ordinary laws of trade that have been honored in every country for ages.

WHAT we did set out to say is that, just as New York is the largest city in the country, so is it, architecturally speaking, the most degraded, and that its condition is not more shameful than it is is due to the wielders of these same swollen fortunes. The proof? No, it isn't to be looked for in the expensive dwellings on Fifth Avenue and adjacent side streets; it is not to be discovered in the churches, the hotels, or the costly apartment-houses, but it is to be seen clearly in such urban oases as the great stores of John Wanamaker, Tiffany, Altman, Macy; in the buildings of the great insurance companies and in the modern type of one-story bank buildings, all of which buildings, though the very purpose of their being is trade and increase of gain, have essentially escaped the desecrating touch of the sign-writer, as the members of the honorable guild of sign-painters used to be called. A trip down Broadway in an open trolley-car or a turn about the lower end of the city in a "sight-seeing" vehicle will quickly convince any man who has eyesight and reasonable intelligence that the assumption that the American is a creature of artistic perception is untenable, and that the men who have paid for the buildings he endeavors to see are plain fools.

EVEN if, in these days of pneumatic and electric tools, intricate carved mouldings can be run off by the mile inexpensively, even if all sorts of prettinesses can be found ready-made in the terra-cotta makers' yards, is there the least reason why these and similar architectural attributes should be incorporated in buildings at the owners' cost, only to be instantly blotted out by the sign-boards of that owner's tenants? The really sane improver of property in urban commercial districts would order his architect to provide absolutely plain walls and equally plain window openings, backgrounds quite good enough for tenants who will listen to the siren song of the sign-painter. If he is a man of ordinary means and takes any other course, he challenges his own right to be called a good man of business. But if he is the possessor of a swollen fortune he can say to his architect: "Give me all the art you can, for I shall enjoy it and not mistreat your work, as I can use all of my building myself, sha'n't have to have any tenants, and can bite my thumb at the sign-painter." In short, the sign-painter is the most pernicious and active enemy that urban architecture has to contend with in these modern days. Macauley's New Zealander, when he comes to consider the deserted skyscraper, will perhaps decide that the reason why American architects so lavished architectural treatment on the three or four upper stories—where it evidently could not be seen and enjoyed from the street—must have been that they perceived that these upper heights were the only portions of a façade at all likely to escape the effacing hand of the sign-writer.

THE very first step on the road towards a "city beautiful" should be the abating of the sign nuisance, and since the nuisance has grown to such proportions, and has such universal extension, it can easily be dealt with through a general law or ordinance which, having universal application, would be likely to meet less opposition than an attempt to abate individual flagrant assaults on the public sense of artistic decency and pro-

priety. What is needed, at the very least, is a law compelling tenants to confine their signs to the positions and spaces that the architect, in designing the building, has provided for such announcements, that is to friezes, panels and plain wall surfaces unbroken by architectural mouldings or features. Better still would be a law confining signs to the surfaces of the window-panes, for here, less than elsewhere, can they do injustice to the architectural treatment, for the designer has always known from the start that the general effect of his façade was going to be affected by these same lettered window-signs, by the color of the window-shades, by the form and color of the curtains, by the character, shape and color of the goods displayed in them, and by the varying reflections due to the shape and color of buildings across the way, and the changes of lighting due to the position of the sun. To transfer all signs to the surface of the windows could not make the effect materially worse than it is, while it would immensely improve the general aspect of a city. Our quarrel is not with sky-signs or the huge embellishments of bare party-walls—indeed we are rather grateful for the latter—nor with the ugly electric signs, whose offensiveness by daylight we can partly forgive because of their occasional real beauty at night. What we do reprehend is the sign-board proper, of every size, shape and color, tilted at any and all angles, and stuck anywhere and everyhow all over the façades of mercantile buildings.

THE Pennsylvania newspapers have published recently the names of nine men once more or less willing tools of Senator Quay's in the operations of his political machine, showing how four of them have committed suicide while the others have died under the strain and heartbreak of a deserved public disgrace. One cannot help wondering whether in the course of a very few years the same newspapers will not publish a similar necrology in which appear the names of more or less of the men who have just been recommended for indictment and criminal prosecution by the Commission which has been conducting an examination into the frauds that attended the building of the Pennsylvania Capitol. The Commission seems to have been caught by the fancy for presenting only thirteen names—apparently one for each million of dollars spent on the building—though it is said that there are eighteen subordinate officials who may also be proceeded against. In addition to criminal suits, the report is said to recommend the bringing of civil suits against the two general contractors—for the building proper and for the furnishing—the sub-contractor for the metallic furniture, the architect, their several bondsmen and some others. We confess to not understanding the non-inclusion in the list of the name of ex-Governor Pennypacker, the relative, friend and admirer of Senator Quay, the bombastic eulogist of the building and its designer, the affirmer of the perfect rectitude of everybody that has had part in the undertaking. We understand that the report declares that on "the goods sold to the State" by Sanderson and the metallic furnishing contractor, a net profit to the vendors of $4,860,349 has been seemingly proved, and we infer that this large sum will be enhanced by the graft that was procured by other parties and in other ways.

IN connection with the constant demand in this country for new court-houses and more court-rooms, demands which architects are, of course, charmed to satisfy, we took occasion recently to direct attention to the great injustice that is done to criminals and the business public at large through the closing of the courts for the "long vacation," an institution, quite foreign to American theories and principles of fair-play, which might better have been left behind in England with the barrister's horsehair wig rather than brought to this country to vex us. Even in England the institution does not satisfy the public wholly, and a recent Order in Council has moved the date of beginning the "long vacation" from August 13 to August 1, so that it may synchronize better with the season of dull business and the vacation period of other men. But, in this country at least, we think the closing of the courts and the total suspension of legal redress is a great wrong, and that as Crime never sleeps, so Justice should be no less wakeful. The phenomenal success that has attended the opening of a night police-court in New York City should be held to demonstrate at once the undesirability of having courts closed and the fact that our court-houses and court-rooms can do much more service than they are called on to render under existing practices.

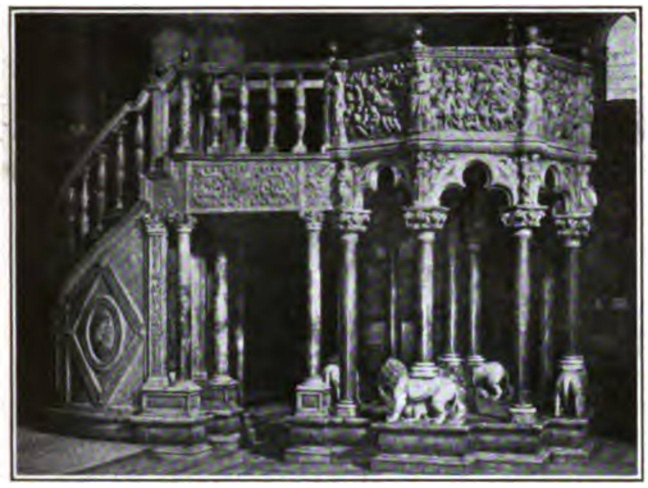
AS at the election in November the office of District Attorney for Suffolk County, Mass., is to be filled, Boston papers are giving much attention to the doings of the fantastic individual who is the incumbent of the office at present, and also to the pleas and promises of those who are to contest the election with him. In a published letter of one of these aspirants, Mr. C. W. Rowley, we are interested to note that a strong point is made of the iniquity of the "long vacation" as it operates in Massachusetts, where it extends over "about three and one-half months in summer," to say nothing of Christmas and Easter recesses. Mr. Rowley shows that the courts sit only five hours per day on five days each week, and, although his comparison of a judge's 875 hours of court-room work compared with the 2,400 hours' work of most business men is mere demagogy, since judges work long hours out of court, and even during vacation, his figures serve to show that court-rooms are vacant and unused an undesirable length of time; and his promise to endeavor to save the city $100,000, if elected, by reforming the sittings of the court might easily have been made to apply to a much larger saving, since Boston is on the point of spending largely for the sake of procuring more court-rooms through the enlargement of the court-house for Suffolk County. The long vacation is a commercial and economical waste that demands instant abating.

ON the recommendation of the Fine Arts Federation, Mr. Arnold W. Brunner has been appointed to fill the place in the New York Municipal Art Commission vacated by Mr. Walter Cook, now become the Mayor's architectural personal adviser. The community gains by each of these important changes.

Italian Cities—XX

Siena—III

IN 1266 Niccolo and Giovanni Pisano were entrusted with the execution of a marble pulpit, and their skill has wrought a real chef-d'œuvre. The pulpit, octagonal in plan, is carried by nine columns, four of which rest upon the backs of lions and lionesses, each shaft being crowned by a differing capital of great beauty. The arch which connects these capitals two by two is trefoiled. Above the arches comes a wide frieze decorated



THE PULPIT, SIENA CATHEDRAL.

in bas-relief with carvings that have a lifelike intensity of expression that is quite without parallel. There are seven of these carved panels, representing the Birth of Christ, the Epiphany, the Presentation in the Temple, the Flight into Egypt, the Slaughter of the Innocents, the Crucifixion, and the Last Judgment. The scene of the Crucifixion is treated with breadth and yet with painstaking heed to verity; the most confirmed idealism is united with care for exactitude, but the realistic detail does not detract from the elevating impression roused by the whole. At one side, the Mother of Christ has swooned away, and with the body of the Savior incarnates the grief of the world; upon the other, the Jews are insulting their agonizing victim, just as the Evangel relates. The almost countless personages who animate these bas-reliefs stand out so sharply one from another, the different planes are so happily indicated, that admiration and applause are excited in the presence of a

BAS-RELIEF ON THE PULPIT, SIENA CATHEDRAL.

work whose details reveal such infinite and scrupulous painstaking. Riccio designed the staircase leading to the pulpit. Charming balusters, delicately carved, support the hand-rail, and the curved supporting wall of marble slabs is decorated with foliage of exquisite delicacy wrought with highest skill.

The Chapel of S. Giovanni owes its name to the slender statue of the Precursor, by Donatello, which makes tangible all the mastery of the grand Florentine. The stalls in the choir are held to be the most perfect of their kind, as are those at Monte Oliveto Maggiore, which lies some thirty kilometers distant from Siena, where Fra Giovanni di Verona manifested in very much the same way the inexhaustibleness of his creative fancy. Through a

DETAIL OF THE PULPIT, SIENA CATHEDRAL.

door which opens on one of the aisles we enter the "libreria," so called because of the ancient illuminated antiphonaries that are stored there. On its walls Pinturicchio painted scenes from the life of Pius II., with a *brio*, a distinction, a coloration, which have never since been surpassed. On seeing these tones, so brilliant and so fresh, one would never guess that four centuries had passed away since the artist's brush brought them into being. But the especial peculiarity of the Cathedral of Siena is, beyond dispute, its pavement.[1] The oldest of the artisans who worked on this pavement simply traced on the marble a sort of "graffiti"; their successors used marbles of different colors, as if they were working in marquetry; still others later improved and perfected this process, and at length Domenico Beccafumi, by a rational employment of marbles and their perfect grading, transformed his designs into veritable pictures. Employed in 1517 to complete the pavement, he worked upon it until his death. His two

BAS-RELIEF ON THE FONT IN S. GIOVANNI, SIENA.

large compositions, "Moses Making the Tables of the Law," and the "Sacrifice of Abraham," with their surrounding borders, prove his possession of a rare science in grouping and composition: there is no confusion or crowding, no overabundance of person-

[1]See "American Architect" for November 10, 1906.

ages or exaggeration of movement. He introduces only the actors who are essential to his drama. In each episode the action is indicated by the appropriate gesture. Everything is simple and well-balanced. Like the Florentine masters of the previous century, Beccafumi understood the simple poetry of the Bible and knew how to translate it. About the "Sacrifice of Abraham" he

DETAIL FROM THE HIGH-ALTAR, CHURCH OF FONTEGIUSTA, SIENA.

represented the exodus of the Hebrews, a long, tumultuous procession, altogether pagan in movement and force, so that one quite feels as if in presence of a Greek theme declaring the glorification of the joy of living.

The Palazzo Pubblico, or Palace of the Republic, dates to the end of the thirteenth and beginning of the fourteenth century. The first stone of the Tower of the Mangia was laid in 1325. Although somewhat altered during the passage of the centuries

THE ARCHIEPISCOPAL PALACE, SIENA.

which have allowed the disappearance of sundry Gothic details, it remains, with the Cathedral, the most complete monument of the mediæval city. It consists of three stories and its façade is cut by two rows of pointed windows divided into three by slender colonnettes. At one of the corners rises the Mangia tower that bears aloft the bell that sounded the most sinister as it did the most joyous hours of the Republic. Like the rest of the Palace, the tower is of brick, only its crowning portion, which rises vase-like upwards, is of stone. Just below stands an elegant chapel built in fulfillment of a common vow made during the pestilence; it shelters a fresco by Sodoma. Here, every day, mass is said and the workmen and the occupants of the surrounding houses

THE PALAZZO SANSEDONI. SIENA.

without abandoning their work or leaving home can in a measure hear and join in the celebration; and at the moment of elevating the Host a trumpet is sounded to give notice of the fact.

The interior of the Palace, the seat of civic life, reveals the most notable frescos in all the history of Sienese art. Upon them labored the most celebrated artists: in the hall of the Mappamondo, Simone Martini painted a Virgin under a great baldachino borne by eight of the Apostles. Historic symbolism,

THE PALAZZO PUBBLICO, SIENA.

too, has free play. One sees here the ancient and the new law, corresponding doubtless as closely to the transformations in the politics of the city as to the New and the Old Testaments. At one side, the work of the same artist, is to be seen the famous portrait of Guidoriccio da Fogliano, in which the painter surpassed himself. The frescos in the Hall of the Nine are by Am-

brogio Lorenzetti. He, moreover, not content with offering to his fellow-citizens visible examples of eminently moral doings, placed under each painting the most explicit inscriptions celebrating concord, virtue and peace and scarifying tyranny. Did this art, so full of noble suggestion, contribute much toward elevating the moral tone of the Sienese? It would be rash to make such an assertion; but the attempt was greatly to the honor of Lorenzetti. Other halls contain paintings by Sano di Pietro, Sodoma, Vecchietta, and Matteo di Giovanni. The Hall of the Consistory was decorated by Beccafumi, who, in conformity with tradition, grouped here the heroic examples of the love of country that are furnished by Greek and Roman history. He, too, represented in the middle of the ceiling Justitia surrounded by Amor Patriæ and Concordia.

As to the general appearance, the Palazzo Pubblico, placed at the lower end of the shell-shaped central piazza, and the piazza itself are really unique. Recall the impression they made on Charles Dickens: "The market-place, with a great broken-nosed fountain in it; some quaint Gothic houses and a high square tower, outside the top of which—a curious feature in such views in Italy—hangs an enormous bell. It is like a bit of Venice without the water. . . . The town is very dreamy and fantastic."

The Church of S. Giovanni, which serves as the baptistery and is placed below the choir of the Cathedral, has a Gothic façade which, though unfinished, is very interesting. There are those who do not hesitate to prefer it to the Cathedral's. It was designed by Mino del Pellicciaio. The sobriety of the design of the doorway, the fine lines of the pilasters, the gracefulness of the ornamentation that divides up the façade, all please the eye. The interior is particularly noteworthy because of the presence of the baptismal font by Jacopo della Quercia, though it must not be thought that the grand master alone worked on them. Many of his pupils helped, especially Pietro del Minella, Bastino di Corso and Nanni di Lucca, who did no disgrace to his teaching. The bas-reliefs that decorate the six sides of the font have an art value that is beyond price.

In 1427 that perfect goldsmith, Turino di Sano, and his son, Giovanni, carved the Birth of John the Baptist and another scene from the life of the Precursor. Giacomo della Quercia had been entrusted with the execution of two other bas-reliefs, but made only one, the Apparition of the Angel Gabriel to Zaccharias, in the Temple. Donatello treated the most tragic subject, as that best corresponded with his temperament, and represented the scene where the head of John the Baptist is brought to Herod. His energetic style provided the means of expressing emotion with an intensity that outstripped his fellow workers' efforts. We owe to Ghiberti the Baptism of Christ and the episode of John conducted to prison. He reveals a dramatic force and an intuitive perception of verity in these two works, into which he put, with all his knowledge and his love for his art, the most sustained effort of his æsthetic conception. Besides these, Giovanni di Turino carved the figures of Charity, Justice and Prudence. Force was the work of Goro di Neroccio, and Faith and Hope were done by Donatello. The graceful and elegant shape of this baptismal font, the life and movement which the bas-reliefs exhibit, and the illustrious qualities of the sculptors who gave them their splendor place it amongst the most precious trophies of Christian art.

STANDARD-BEARER, FROM THE PALAZZO MAGNIFICO, SIENA.

The Church of S. Francesco, now altered and restored, was originally one of the fairest of Siena's churches. It dates back to the early years of the twelfth century, and popular favor used to decorate it with precious chefs d'œuvre. Unfortunately a fire in the seventeenth century and the eighteenth century's hatred of all things Gothic united for its degradation. Its style was, however, quite individual, as can still be ascertained. Attached to a monastery, it had rather a severe and monastic air. The high and long pointed windows are divided in two by slender and supple colonnettes and admit light through painted glass. There are no vaults, the ceilings being of wood. Even in its present state the church has a profound effect on the visitor. There is nothing to catch the eye. The great empty nave disposes one to austere reflections, so greatly is the spirit influenced by architectural surroundings. The few works of art to be found in the building come from other monuments.

The Church of S. Domenico creates an analogous feeling. All of brick, like the other, massive and low, it was begun in 1220. Exteriorly there is no ornamentation, if we except the solid buttresses. Its tower dates from the fourteenth century. The building has but a single nave and no ceiling. In the Chapel of St. Catherine, Il Sodoma depicted the scenes in the life of the saint, notably the episode where Catherine, having received the divine stigmata, swoons in the arms of her two sisters. Here the voluptuous side of his talent breaks out. He shows the after-effects of the miracle, of the too powerful divine communion, when the poor woman, no longer able to endure the mystic effusion, loses consciousness and falls. If the fresco is marvelous in drawing and color, it nevertheless shows evidence of a want of faith.

The greater part of the remaining churches have no architectural interest, except the one that fronts the Cathedral, Santa Maria della Scala, a twelfth century building, in which there is a strange bronze, the Risen Christ, by Vecchietta. The Churches

of S. Agostino and Sta. Maria del Carmine are quite devoid of character, as is also S. Martino and some others. The Oratory of S. Bernardino has some singularly personal paintings by Sodoma and Beccafumi, while the Church of Fonte Giusta, a Renaissance building, contains a fine high-altar by Marrina.

The Sienese palaces, though the harmony of their proportions eludes the eye more often than not, because of the impossibility of getting far enough from them so as to see them under a favorable visual angle, do not impair the city's archaic *cachet*. The Palazzo Grottanelli, wherein formerly lodged the Captain of the People, near the Cathedral, ably restored to its pristine condition, permits one to imagine himself in the historic midst of the thirteenth century. In it brick and stone alternate; colonnettes divide its pointed windows into two and the upper story is crenellated like a fortress. The Palazzo Sansedoni, fronting the Palazzo Pubblico and in keeping with it, is surmounted by a truncated tower. It is built on a semi-circular plan, so as to conform to the shape of the piazza. The Palazzo Tolomei (1205) has more the air of a fortress than a habitation: the nakedness of its stonework is broken only by an enormous doorway and two rows of very simple pointed windows. Its military tower has been destroyed. The name of the Tolomei will be celebrated through the ages in consequence of a passage in Dante where the poet alludes to a drama enacted by the family. The Palazzo Chigi or Sarracini repeats the elements of the Palazzo Sansedoni.

The Renaissance created some charming specimens, as for instance the Palazzi Palmieri, Bichi and Spannocchi. As for the dwelling of Il Magnifico, Pandolfo Petrucci, it is especially celebrated for its admirable torch-holders and standard-bearers wrought in iron by Giacomo Cozzarelli.

Of the various convents and monasteries scattered through the Sienese territory, the Abbey of Monte Oliveto Maggiore contains frescos by Luca Signorelli and Sodoma. Signorelli's talent, robust and violent, animates eight frescos, which depict scenes from the life of St. Benedict, while the lighter-handed, more amiable, if somewhat ironic, Sodoma selected from the legends which affect the Saint those subjects that best suited his talent. Notwithstanding the great esteem he deserves, it must be conceded that this time he was far less successful than his competitor, the only artist of his day who could rival Michael Angelo in his symbolical intuitions and their adaptation to the requirements of ornamentation. However, the landscape sketches that Sodoma introduced into his frescos make one regret that he did not devote himself to that branch of art. The superiority of the master of Cortona is all the more apparent because of the contrast.

HONORÉ MEREU.

Cost of Maintaining English "Show-places"

It is a pathetic fact that there are several men in the United Kingdom who would consider themselves on the brink of bankruptcy if they were reduced, by any evil stroke of fate, to a mere pittance of £1,000 a week—who would find it simply impossible to "rub along anyhow" on the income of a simple millionaire, which would be barely sufficient in some cases to pay the expenses of the lordly pleasure-houses which they have inherited from their ancestors.

The Duke of Devonshire, for example, has no fewer than seven of these stately homes—six in England and one in Ireland—each of them fit for the reception of a king, and not one of which, as he confessed the other day, he has yet lived in long enough to explore thoroughly. Probably he himself does not know within £1,000 how much these palatial homes cost yearly to maintain, but the annual cost has been said to make a very big hole in £100,000.

In Wentworth Woodhouse, which is only one of his four "palaces," Lord Fitzwilliam owns the largest private house in England. It has a frontage of 600 feet, its hall is so enormous that four suburban villas could be built inside it, and its owner could live in a different room every day for six weeks and still leave several rooms unseen. The Duke of Portland owns five regal homes in England and Scotland, the value of which runs into millions, and which, with the attached gardens and estates, keep hundreds of servants employed. At Welbeck he has over thirty acres of kitchen-gardens alone; in the glass houses and garden proper he employs about seventy men and boys, and his horticultural bill for this one house is said to exceed £6,000 a year.

Blenheim Palace, the Duke of Marlborough's Oxford seat, is so colossal that the late Duke used to declare he spent £800 a year on putty alone for his window-panes. It actually cost £300,000 to build in days when money was more valuable than it is to-day; it is 348 feet long, has fifteen staircases, and when it was repaired some time ago his Grace found it necessary to sell his pictures and books to pay the cost, which amounted to over £300,000. The Duke of Northumberland owns five stately seats, at one alone of which—Syon House, Brentford, a staff of thirty or forty men is kept busy, largely in the magnificent kitchen-garden and fruit-houses. And yet the Duke spends only a small portion of the year in this princely home, the rental value of which probably exceeds the Lord Chancellor's official income.

The Marquis of Bute has five seats in England, Scotland and Wales, and one of them, Mountstuart, Rothesay, covers an acre of ground, has 150 rooms and has actually cost over £2,000,000, representing, even at a modest 4 per cent., a value of £80,000 a year. One can easily understand that his lordship's income of £230,000 a year is not a penny too much for the demands on it. Of Lord Londonderry's four seats, Wynyard Park (Stockton-on-Tees) is 100 yards long, and boasts a sculpture-gallery 100 feet long and 58 feet high; while Goodwood, one of the Duke of Richmond's four mansions, measures, with its two wings, 378 feet, and requires about sixty domestics to keep it in order.

Castle Howard, the splendid Yorkshire seat of Lord Carlisle, has 125 rooms; Raby Castle stands on two acres; Stafford House, the town residence of the Duke of Sutherland, gives employment to some sixty servants, and costs about £20,000 a year to keep going, and Eaton Hall cost over £1,000,000 to build.

Such are but few of the "stately homes of England," some of which are not seen by their lordly owners for more than a few weeks, if at all, in a year, although each of them costs many thousands a year to maintain.

It is said that there are at least sixty country homes in the United Kingdom which require a staff of from 250 to 500 servants, and involve an annual bill for wages ranging up to £20,000, and in many of them the gardens alone account for more than £5,000 a year. How large are the numbers of servants employed in connection with these houses and estates is shown by the following example—that of a relatively modest establishment in Suffolk: The total number of servants employed is 173, and of these the home farm and stables require 54 and the gardens 40; indoor servants number 17, keepers and night men, 16; the parks and lakes employ 10; the brick-kilns 9, while there are 7 carpenters, 4 bricklayers, 4 warreners, 3 lodge-keepers, 3 painters and half a dozen engineers, blacksmiths and wheelwrights.

This, it should be remembered, is but a second-class establishment, although its wages bill reaches £8,000 a year. Of still smaller establishments there are about 600 in the United Kingdom, employing between fifty and a hundred servants, with wages bills averaging at least £4,000.

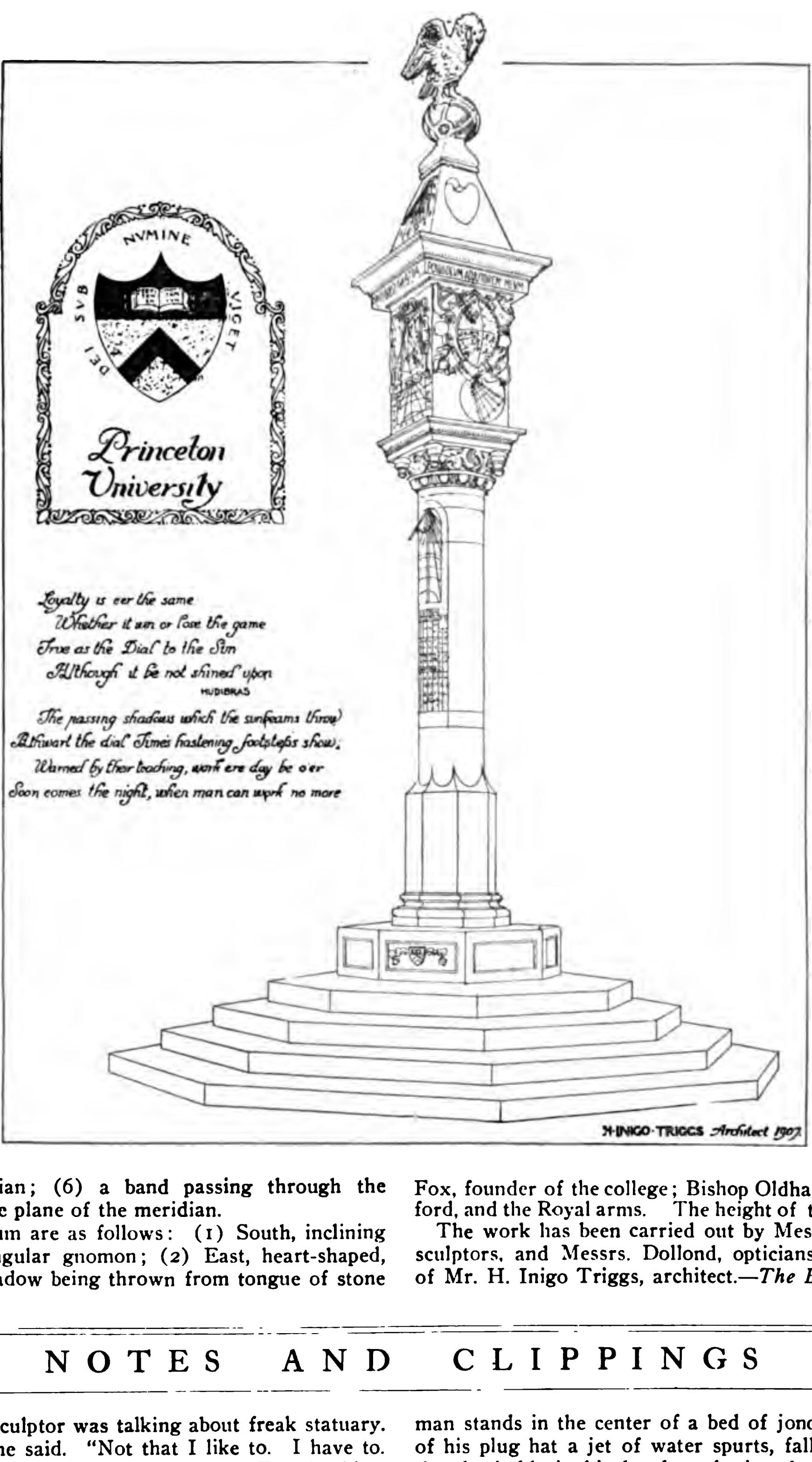
Expensive as country seats are to maintain, with a few exceptions such as those mentioned they are little more costly than town houses. For a tiny house in Park Lane, such as would be procurable in a London suburb for £60 a year, a rental of £3,000 is asked; while some of the larger houses command a rent running into five figures. In Grosvenor Square the rents range from £1,000 to £6,000 a year; in St. James's Square you may pay as much as an annual £10,000; £60,000 has been paid for a house in Carlton House Terrace, and Lord Burton gave £150,000 for a house in South Audley Street.

And town and country houses are but a part of the expenditure of the wealthy class we are considering. A steam yacht may easily run away with £5,000 a year; a similar sum is by no means uncommon for a grouse moor and a deer forest; a London season, with its costly entertainments, may equally easily account for £10,000, and so on through the long list of items which figure in the annual balance sheet of the rich, and which are considered as necessary to them as his tobacco to a poor man. It is thus not difficult to see how an income of even £100,000 or £200,000 may be dissipated, and how aghast many a man would be if he were suddenly brought face to face with the necessity of cutting down his expenditure to a pitiful £50,000 a year.—*Tit-Bits.*

Sundial for Princeton University

THIS sundial has just been completed for the University of Princeton, New Jersey. It is the gift of Sir William Mather to the University, and will be placed in a prominent position in the college grounds. The work is a replica of the famous dial at Corpus Christi College, Oxford, with the addition of a series of octagonal steps to form a base, an addition which it was felt added to the composition.

The original dial at Corpus Christi College was constructed in 1581 by a certain Charles Turnbull, a Lincolnshire man, who was admitted to the college in 1573, and was the author of a treatise upon the celestial globe. In the college library are manuscripts and a sketch of the dial, made about 1625-1630, showing it as originally planned with a surrounding gallery. The dial faces are correctly north, south, east, west, and there are in all twenty-four gnomons, four of which give the time of the year, indicated by the signs of the Zodiac, as well as the hours. The top of the shaft is divided into fifteen degree divisions, and the globe on which the pelican stands represents the terrestrial sphere. This latter has rods projecting from its north and south sides forming its axis, which is parallel to that of the earth. The stone is cut away, leaving the six following bands raised above a solid core: (1) Equatorial band; (2) North Polar band; (3) South Polar band; (4) the Zodiacal belt incised with the signs; (5) a band passing through the Poles in the plane of the meridian; (6) a band passing through the Poles perpendicular to the plane of the meridian.



The dials on the frustum are as follows: (1) South, inclining dial, with ornamental angular gnomon; (2) East, heart-shaped, hollowed-out dial, the shadow being thrown from tongue of stone between the lobes; (3) North, inclining dial, with ornamental angular gnomon; (4) West, semi-spherical, hollowed-out dial, the gnomon being a rod.

The square member above the pillar bears no less than nineteen dials, of which seven are in the escutcheon on the west face and nine in that of the east. The carving is so arranged that a portion of the edge of certain hollows is parallel to the earth's polar axis, and can thus act as a gnomon, the position of the shadow at the hours in the hollows being traced therein. Under the escutcheons on the south, east, and west faces are vertical dials reading the hours and also indicating the months. The gnomon in each case consists of a point only in the bottom of each escutcheon. In the original the stone itself served as a point, but in the replica small gun-metal points have been inserted on account of their greater durability. The shaft bears one dial on the south of its upper part with an angular gnomon: the table under the dial has a form of perpetual calendar, the length of the year of various planets, and certain lunar data.

In the moulding forming the capital of the pillar are the following four inscriptions:

North: Est reposita justitiæ corona.
West: Gratia dei mecum.
South: 1581, Est deo gratia.
East: Posui deum adjutorem meum.

The two inscriptions shown on our plate are inscribed in panels on the base, and are not therefore on the original dial.

The coats-of-arms are carried out in true heraldic colors, and are those of Bishop Fox, founder of the college; Bishop Oldham, the University of Oxford, and the Royal arms. The height of the whole is about 26 feet.

The work has been carried out by Messrs. Farmer & Brindley, sculptors, and Messrs. Dollond, opticians, under the supervision of Mr. H. Inigo Triggs, architect.—*The Builder.*

NOTES AND CLIPPINGS

Freak Statuary.—A sculptor was talking about freak statuary. "I turn out a lot of it," he said. "Not that I like to. I have to. So many of our millionaires have uncouth tastes. The freakiest of my freak statues stands in a Boston garden. It is the statue of the owner's grandfather, an old Presbyterian divine. The aged man stands in the center of a bed of jonquils, and out of the top of his plug hat a jet of water spurts, falling into a marble basin that he holds in his hands, a basin wherein swim half a dozen goldfish. The idea of treating one's grandfather like that!"—*Monumental News.*

ILLUSTRATIONS

FRONT OF S. GIOVANNI, OR THE BAPTISTERY, SIENA, ITALY.

THE PALAZZO TOLOMEI, SIENA, ITALY.

THE PALAZZO BUONSIGNORI AND THE PALAZZO GROTTANELLI, SIENA, ITALY.

For descriptions of these and the foregoing subjects, see article "Italian Cities," elsewhere in this issue.

PILASTERS NOW IN THE ACADEMY OF FINE ARTS, SIENA, ITALY.

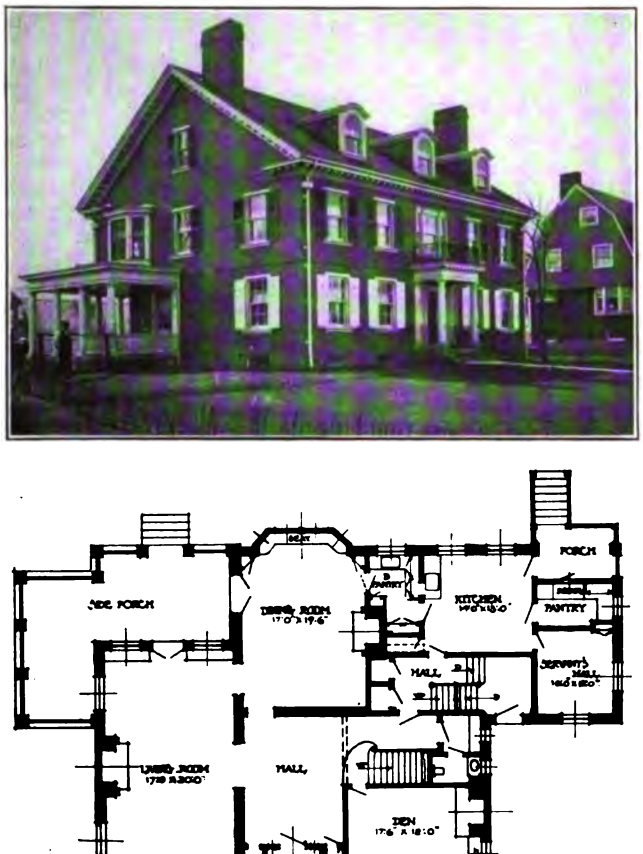
HOUSE AND STUDIO OF MRS. MARY LAWRENCE, SPRINGFIELD, ILL. MR. FRANK LLOYD WRIGHT, ARCHITECT, CHICAGO, ILL. THREE PLATES.

HOUSE OF GEORGE E. M'CAGUE, ESQ., SEWICKLEY, PA. MESSRS. ALDEN & HARLOW, ARCHITECTS, PITTSBURGH, PA.

Additional Illustrations in the International Edition.

ENTRANCE TO LEON MANDEL HALL: CHICAGO UNIVERSITY, CHICAGO, ILL. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON, MASS.

[CORRECTION:—Our apologies are due to Messrs. Rutan & Russell, of Pittsburgh, for the accidental attribution to Messrs. Alden & Harlow of the authorship of the Phipps Hall of Botany, published in our issue for August 17.]



HOUSE OF B. S. COLBURN, ESQ., BURNS AVE., DETROIT, MICH.
Albert Kahn, Architect.

NOTES AND CLIPPINGS

LATTEN.—The material of a "brass" is thus succinctly described by Mr. Herbert W. Macklin: "Strictly speaking, the material used is not brass at all, but an alloy consisting of about sixty parts copper, thirty zinc, and ten of lead and tin. The result is a peculiarly hard metal, capable of resisting much rough usage. Indeed, brasses are often nearly as perfect now as when they were first laid down, and have frequently outlasted not only their companion monuments of other kinds, but the stone or marble slabs in which they have themselves been set, and the very buildings which originally contained them. The ancient name for the metal was latten, and it was manufactured exclusively on the Continent—at least until the middle of the sixteenth century—in Flanders and Germany, and particularly at Cologne, whence it was imported into England in rectangular pieces known as Cullen plates, to be cut out and engraved by English workmen and artists."

LONDON'S NEW STATUES.—In addition to the equestrian statue of the late Duke of Cambridge, the granite pedestal of which has just been set up in Whitehall, some half-dozen others will be placed in position shortly. The German Emperor has given us a statue of his ancestor, William of Orange (William III.) which our pawky Premier says will be appropriately placed near the Orangery at Kensington Palace. Close by it, at the Round Pond, will be erected the replica of "Physical Energy," by G. F. Watts, R.A., the original, exhibited in the quadrangle of the Royal Academy, being now at the Cape. Actors are giving a statue of Sir Henry Irving, and a statue of Clive will be placed in London as well as in India, if the subscriptions admit of it. The memorial to the Royal Artillery who fell in the South African war will be located inside the park rails opposite the Duke of York's steps, near that of the Royal Marines, while the base of the colossal statue of Queen Victoria, in front of Buckingham Palace, is slowly progressing. It is proposed also to erect a statue of Mr. G. F. Watts at the Tate Gallery and one of Dr. Johnson in the Strand. It is also proposed to place a national South African memorial opposite the Crimean one in Waterloo Place.—*London Globe.*

A SPECIMEN OF MAGPIE ARCHITECTURE.—One of the finest specimens of Jacobean "magpie" architecture still remaining in South Lancashire is, says the *Manchester Guardian,* Old Crooke Hall, which stands on the banks of the River Douglas about two miles below Wigan. Over the porch is carved the date 1608, so that this interesting bit of bygone Lancashire has all but completed its third century. The oak door studded with huge nails, the long wrought-iron hinges, the elaborately twisted knocker, all bear witness to the date of the building. On one side of the porch is a horsing or pillion stone, which takes us back to the days when the lady of the house rode behind her "master" to Wigan market. The two wings of the house are connected by a large low hall with lattice windows set in stone mullions; in it there is a very long oak table, apparently of the same date as the house, for it is carved after the fashion of the early Stuart period. No doubt its enormous size has prevented its being carried off by devotees of old furniture.

SIDE ALTARS.—The Dean of Arches, Sir Lewis Dibdin, has decided on appeal that side altars are legal. The point previously made against them was taken from an Order of Council addressed to Bishop Bonner in 1549, which directed that the Communion should be celebrated only at the high-altar. Reformation visitation articles also ordered the removal of all but the main altar. But the Dean brushed all these precedents aside, saying they dealt with conditions which had now passed away. The Prayer Book did not contemplate more than one altar, but the rubrics did not explicitly prohibit others. The language of the old missals spoke of "one altar" very much in the same way. When the altar was mentioned in the Communion service it meant the altar in use. Many cathedrals already had more than one altar, and the practice could not be called rubrically illegal. The altars were removed in the sixteenth century to do away with the custom of private masses. They might well be restored now whenever the convenience of the minister and the congregation required them.—*The Churchman.*

A BURIED CITY IN TEXAS.—Prof. T. L. Everly, an archæologist and instructor in the Canadian College at Hereford, Texas, has discovered a buried city in Ochiltree county, 100 miles northwest of Hereford, in the extreme northern part of the Panhandle. A number of mounds upon a level plain attracted Prof. Everly's attention and he began investigations. His excavations have revealed buried buildings in which are human bones, ancient pottery and stone utensils. The mounds are rectangular and their number shows that it was once a city of several thousand people. The character of the ruins indicates that they antedate the Aztecs. —*New York Sun.*

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SOCIETIES, PERSONAL MENTION, ETC.

PENNSYLVANIA still continues to be the storm-center for matters of interest to architects, for though affairs at Harrisburg in connection with the great Capitol scandal are for the moment quiescent, an ebullition almost equal in its violence is going on at Pittsburgh. There the contest over the several competitions for the Central High-school, to which we have referred before, is being carried on with unusual stubbornness on each side, and it is evident that, if the architects and their lawyers can escape having their plea thrown out at last through the upholding by the court of some petty legal technicality, a principle of much interest and importance to architects may at length have judicial determination, perhaps affirmation. But the Board of Education evidently mean to adduce every and any technical objection that can be conceived, and one excuse that they have brought forward is sufficiently peculiar to be put on record. Not content with asserting, in defiance of a court ruling, that the present suit should be brought at law and not in equity, and endeavoring to maintain that the building-committee was not competent to make the award and appoint an architect in the original competition, the full Central Board of Education now seeks to establish that an implied contract between the city and the partakers in the original competition could not possibly have been created, because the announced terms of the programme had been found unacceptable to some, the consequence being that, although ten architects were invited to compete, only nine accepted and actually, relying on the city's good faith, spent their own good time and submitted designs! This, it seems to us, is carrying the Socialist doctrine, "one for all and all for one," beyond the extreme limit. It is fortunate that Messrs. Palmer & Hornbostel and their supporters are financially well equipped for carrying on a costly suit, but it is just possible that before the end is reached they may not object to such aid as the Institute and individual architects may find themselves disposed to offer.

PITTSBURGH, or rather Allegheny County, and Messrs. Palmer & Hornbostel, have also come into collision in another important matter, and here again the question is of deep concern to all architects. Although the County Commissioners have properly and lawfully issued to the architects a Treasury warrant for $30,000, to cover the first payment on account of the architects' commission on the Soldiers' Memorial Building, which is to cost at least one million dollars, County Controller Booth has taken it upon himself to refuse payment, saying, as quoted, that "next to the exorbitant cost attached to a design of this kind, there is nothing to arouse so much just criticism as the liberal commission paid to an architect on furnishings with which he has nothing to do. I will not pay the warrant unless ordered to do so by the court." Of course there is no question as to the ultimate, even the speedy, payment of the disputed account, but the incident is of interest in connection with what we said a short time ago as to the desirability of providing a more scientific method of computing an architect's fee than that which obtains at present. Here we have a responsible public official putting his finger on one of the several weak spots that can be found in that method, one that is so obvious that it probably does more than anything else to prejudice a court against an architect's claim, and to induce the venting of those caustic and dogmatic dressings-down that judges on the bench delight to shower upon the honorable practitioners of a liberal profession. To be sure, the word "furnishings" is just now *anathema maranatha* in Pennsylvania, and that may account for the present incident; but so long as architects compute their charges according to the prevailing system they will run the risk of encountering this sort of opposition by disbursing officers—who may only be seeking public applause for political reasons—with the chance of having their just claims disallowed by a splenetic judge.

AND, speaking of Mr. Hornbostel, we are reminded that we did him injustice, unintentionally of course, a week or so ago. Intending merely to signalize the fact that his attempts to better the architectural character of New York bridges had been unfortunate, we now note that we conveyed the impression that his non-success was due to some artistic fault or architectural vice of his own. The fact is that Mr. Hornbostel and his design for the approaches to the Manhattan Bridge—a design which, like Mr. Lindenthal's design for the bridge proper, received the approval of the Municipal Art Commission—were swamped in the battle waged to determine whether the bridge should be suspended by eye-bar cables or spun-wire cables. It will be remembered, too, that in spite of the fact that the eye-bar scheme was approved by engineering experts appointed to pass upon it, the interests which favored the wire cable plan finally pre-

vailed, and Mr. Hornbostel's design had to go into the waste-basket, together with Mr. Lindenthal's eye-bars.

AMERICANS have not been unobservant of the recent rapid increase of population in Canada, particularly in the provinces of the great Northwest, but we had not supposed that there had been a material growth in the number of practising architects. But as there prove to be some six hundred architects established in the country, many of them not affiliated with the existing local organizations, it is quite obvious that there was reason for perfecting a national organization which should carry on and enlarge the undertakings already begun by the smaller societies in the eastern cities. This organization has been effected during a Congress of Architects held at Montreal last week, and "The Institute of Architects of Canada" now takes its place amongst recognized national organizations.

CENTRALIZATION of power, which just now is the shibboleth of the dominant political party in this country, has as a doctrine invaded the architectural field in a way that deserves serious attention. "The First of a New Race of Men Who Build," as their advertisement declares, are with us and they must be reckoned with, and, if it is their intention to use printers'-ink profusely, it may be that the old race of architects, if they would not succumb to this "new race of men who build," must amend their code of professional ethics so as to allow architects to advertise without loss of standing. This new race, which seems of rather a hoggish disposition, advertise that they "are not architects," "are not masons or carpenters," "are not even contractors," and yet they simply want it all. The proper trade appellation for this "new race" evidently is "undertakers," but as this term is already appropriated and altogether too lifeless a name for such very active gentlemen as they propose to be, they may have to adopt the equivalent French term and be known as "*entrepreneurs.*" The "new race," by the virtue that lies in much printers' ink, propose to abolish independent architects, transforming them into their own servile tools. They invite those about to erect a building of any class or cost to place the job in their hands without reservation and without fear, leaving them to secure a design from such architect as the managers consider most competent for the work, paying him such compensation as they choose to pay, selecting and paying contractors in a similar way, and guaranteeing entire satisfaction to the owner! It is an attractive scheme for those who are trying to apply on a considerable scale a practice that has always been followed by the more or less reputable class of speculating-builders, and presently we may find in every department-store agents of the "new race" quite outworn with booking orders "at the sign of Aladdin's Lamp," shall we say?

ONE does not have to be very deeply versed in the history of art to feel assured that architecture, painting, sculpture, in fact all the fine arts, owe not only much of their progress and development, but even their actual preservation and escape from obliteration and extinction, to the patient work and the still more patient teaching of many a monk, and possibly some nuns. In view of this debt that art assuredly owes to the humble sons and daughters of the Church who forsook the world and its temptations, it is shocking that a nation that asserts its own high appreciation of art, as France still does, should be at this moment prosecuting the nuns once sheltered at St. Joseph de Cluny because, for the sake of earning their own living, they have been teaching painting! The edict of "separation" between Church and State could not have contemplated so unjust and needless an interpretation of the letter of the law as is here implied. There was some justification, perhaps necessity, for the prohibition to teach, but it must have been the real purpose of the framers of the law to put an end merely to such parochial teaching as would have religious, ethical and political effect on the rising generation. It seems impossible that the law could have been meant to cover the teaching of music, painting, drawing or any of the minor arts.

IT seems as if there were a possibility that, presently, there might be brought up for adjudication a novel form of light-and-air case, the singularity of which will lie in the fact that the aggrieved party lodges his complaint, not because his light is cut off, but because too much light is furnished him. Among the inalienable natural rights of man is a right to a proper and natural portion of darkness. As man becomes less natural and more artificial, leaving the country to dwell in the city, he voluntarily waives some part of his birthright, but not all of it, and he certainly retains the right to protest against the invasion of such portion as his own convenience urges him to retain. It seems to us that the act of a New York theatre in hanging out, for advertising purposes merely, a new electric-lamp of three hundred thousand candle-power, directly invades the right to a fair amount of nocturnal darkness owned by each of the would-be sleepers in the large hotel over the way from the theatre. The lamp, a new form, is said to be so much of a success that the inventor is already building one with an illuminating capacity of one million candles! But, as it seems quite possible that someone will call on the Board of Health to abate the present lamp as a nuisance, it would seem well for investors to think twice before they take stock in the new manufacture.

THE motor is now so cheap and "current" is so universally accessible, in cities at least, that we should like to see the apparatus given a humanitarian use by building contractors. There are few things more distressing than to see a willing team of horses vainly trying to back, over broken ground or up the slight declivity from the street curb, a heavy load of brick or lumber to exactly the spot where the builder's convenience or the city ordinances require that it shall be discharged. A line made fast to the rear axle and a few revolutions of an electrically driven winch would not only spare the feelings of the passer-by and the wear and waste of horseflesh, but would appreciably expedite and cheapen building operations, and at the same time help to remove one of the most annoying of the checks on the flow of street traffic.

Art and No Art

AS a nation we have lately developed a large assortment of national enthusiasms. The simple life, the strenuous life, the trusts, physical culture, yellow journalism, nature study, cities beautiful, graft, health-giving breakfast-foods, reform movements, arts and crafts, men with hoes, ladies with axes, both with muck-rakes—from Eastport to Miami, from Miami to Galveston, from Galveston to Los Angeles, from there to Seattle, and from Seattle back to Eastport again, these various subjects are earnestly and frivolously discussed by all of us who are active and "in touch" with modern life, which, thank heaven, in this great and glorious country of ours, most of us are.

I suppose this is a good thing, certainly it is so far as it applies to the topics which I have mentioned above. It shows that we can read, that we have intellect, that advertising pays—and if it did not where would all the newspapers and magazines go? (back to the woods, where the paper that made them would be, too)—and if you add to that that we are Americans, why then surely the whole thing is good. Nothing could be better than to be an intelligent American who can read and knows that it pays to advertise.

I said this is a good thing, and it is—almost all the time—but there are some exceptions. There is no doubt in my mind that it is a great help to us to read all we can about graft and talk all we can about the simple life, do all we can to make the city or town cleaner as to its streets or alleys and more enduring as to its buildings; enthuse to the uttermost on forest preserves, pure water supply, the mosquito war and the wrongs of our Filipino brother. Of these things I am comparatively ignorant, and I say a universal enthusiastic interest in them is fine.

But when this enthusiasm is turned to art, and particularly to art in the home, and still more particularly to architecture through the medium of popular illustrated journals, then I say that it is bad.

The intelligent American who knows how to read (and advertise) will at once infer from the last statement that I am not wholly ignorant concerning art and architecture; he need not, however, infer that my knowledge of them is profound. Of art I know but little and of architecture only a little more. Just enough light has been given me to show clearly the folly of those who, ignorant of art and architecture as I of graft or the simple life, rush in fearlessly and devour gleefully the material so abundantly furnished by the periodical literature of to-day, even as I turn with joyful enthusiasm to the subject of municipal water-supply.

But my delusion is at least a harmless one, or comparatively so. I cannot build water-supplies of my own, not to such an extent that they would seriously cumber the earth, and no municipalities would ask me to build theirs. And for the same reason a round number of our other enthusiasms are good and harmless. The spirit of fair play, combined with a desire to get all he can, is undoubtedly inherent in every being, civilized or uncivilized, and so, just at present, we are hugely interested in trusts—it doesn't seem to hurt them very much and may do us good.

So long, then, as the subject is one of which I am ignorant, one that this enthusiasm does not permanently affect, and one that deals with some inherent right of every civilized being, proud or humble, rich or poor, learned or simple—so long as our enthusiasm is thus manifested it is good.

Art and architecture, however, and especially architecture, are neither of them subjects of this type.

Let me quote Whistler a little. He says: "Listen, there never was an artistic nation" . . . . "people lived in marvels of art—and ate and drank out of masterpieces—for there was nothing else to eat and to drink out of, and no bad building to live in; no article of daily life, of luxury, or of necessity that had not been handed down from the design of the master, and made by his workmen. And the people questioned not and had nothing to say in the matter. So Greece was in its splendor, and art reigned supreme by force of fact, not by election—and there was no meddling from the outsider" . . . . "and the world was flooded with all that was beautiful, until there arose a new class, who discovered the cheap and foresaw fortune in the facture of the sham. Then sprang into existence the tawdry, the common, the gew-gaw. The taste of the tradesman supplanted the science of the artist, and what was born of the million went back to them and charmed them, for it was after their own heart; and the great and the small, the statesman and the slave, took to themselves the abomination that was tendered and preferred it—and have lived with it ever since. And the artist's occupation was gone, and the manufacturer and the huckster took his place. And now the heroes filled from the jugs and drank from the bowls—with understanding—noting the glare of their new bravery, and taking pride in its worth. And the people—this time—had much to say in the matter—and all were satisfied. And Birmingham and Manchester arose in their might—and art was relegated to the curiosity-shop."

I think even the most ignorant of us will agree with this—and, agreeing, find but little cause for rejoicing in a wide and popular enthusiasm for art, and when, as at the present day, this enthusiasm descends upon architecture our plight is even sorrier, inasmuch as that, turn where we may, we cannot but face the results.

Now, as many of us, not so very ignorant perhaps, while admitting that the relative permanence and prominence of architectural works lay them open to more searching criticism, may claim that the results achieved in the last decade or two are good and that these results are at least in part due to this very popular interest and enthusiasm, it might appear that it devolves upon me to establish my claim by demonstrating that the building of the intelligent American citizen has grown worse instead of better architecturally in the last forty years.

It would be easy to do so. But I do not believe this. Architecture has lagged behind in the procession, that is all.

It may as well be said here that my ignorance of art as expressed in painting and sculpture is too great to permit me to consider the effect upon them of this popular enthusiasm. I have quoted Whistler instead, and my comments will be strictly confined to architecture including such adjuncts of domestic architecture as decorations and furniture.

Furthermore, they will be confined to what is usually called the æsthetic side of architecture, for it is to this side that the great majority of periodicals have turned their attention lately. Of course, the desire to spread the gospel of beauty is a laudable one. We know the elevating influence of beautiful things ourselves and we wish every one else to benefit by the same influence. The barrenness of thousands of homes is only equalled by the barbarity of thousands more, and our heart goes out to those who cannot have about them in their daily life the silent influence for good exerted through a simple Colonial exterior or a dull-olive-green-burlap interior with mission-oak fixings.

But the missionary is always tempted a little to run away with himself, no matter what his propaganda may be, and particularly is the missionary in the new field liable to this failing. So that the message to the people on architecture, which is one of the latest, has particularly suffered through the zeal of its bearers.

It was twenty or twenty-five years ago that the pioneers of the present movement appeared in one or two of the very limited number of illustrated magazines.

Those of us who can remember as far back as that will recall with pleasure the "new light" which was given us by means of so-called Queen Anne exteriors and modified Eastlake interiors. We sought early and late for quaint combinations of line and for hitherto unheard-of materials which we might assemble for our dwellings. (It might be said that the utilization of by-products, that wonderful source of profit to our greatest trusts of the present day, was inaugurated by this early popular movement for artistic homes.) The discarded bottle, the heretofore worthless brick, the tin label from our national weed, were eagerly sought by builders of the æsthetic. We found supreme joy in discovering some decorative use to which we could put almost any old thing, provided we discovered it first; the result was marvelous and we took it so seriously! The people who had a sunflower-decorated ten-inch Akron sewer-pipe in their front hall lamented the lack of taste which made a rose-painted tambourine hung up by peacock-blue ribbon desirable to their neighbor; and the tambourine-worshiper lifted his eyebrows at the young wooden snow-shovel which, bearing a picture of Niagara Falls in winter done in "frosted" paint and with a crimson satin bow on the

handle, stood proudly against the parlor wall of his still more benighted neighbor.

So we all acquired the habit, indeed we did; and we knew that at last our homes were feeling the uplifting influence of Art. But those things referred especially to the interior of our castles. It was several years before the magazines took up the education of the people as to exteriors. One of the earliest sinners or saints of the latter variety was a technical magazine which as a "by-product," so to speak, began an architectural supplement. And then, as the fact dawned upon us that advertising paid, the architectural supplement grew, and now the intelligent reading American citizen has between thirty and forty magazines, mostly illustrated, to point the way to higher things in architecture and its attendant hand-maidens—and this leaves out all the Sunday newspaper supplements, too.

Aside from the results, the worst feature of this condition of things is this: Rightly or wrongly, the printed and illustrated page carries with it a certain prestige to nearly all of us; we all swear by our pet newspapers, and all of these magazines with which I have my quarrel are bound to be dogmatic. They can't be critical. It is their job to convince the reader that the simple Colonial mansion modeled after the grand old estate of Beechwood on the James, but brought up to date by the triumphs of modern architectural genius, and which can be built complete, with modern sanitary plumbing, hardwood floors and art glass, for $6,284, anywhere within four hundred miles of New York—it is for them to convince the reader—and looker—that this dwelling is the best of its kind and that this kind is the best.

That they do so convince the reader is evident from the fact that these articles multiply in the popular magazines and that dozens of magazines dealing solely with the subject are being published, all of which wouldn't happen if it didn't pay commercially. Now, the purchaser and reader being told that his purchase is good, is in exactly the frame of mind of the lady or gentleman who takes patent medicines, a frame of mind, to judge from the pictures accompanying patent medicine testimonials, which can but be destructive to the future of architecture and the intellect of the purchaser.

That it is so is evident from the aforesaid results with which we are surrounded to-day.

Twenty-five, fifty or seventy-five years ago American towns and cities were made up, broadly speaking, of two types of buildings—those which were "architectural" and those which were not. That is to say, certain buildings were planned and designed by men who had a certain knowledge of architectural principles and practice, that is, by architects—or were more or less successful attempts at imitation of these buildings; of the other type, and greatly in the majority, were structures which, whether dwellings, factories or business blocks, were strictly utilitarian and depended for what slight attempts in æsthetics they might have upon very simple and long-established traditions in certain details of exterior and interior finish.

The Capitol at Washington, the City Hall and Trinity Church in New York, the Athenæum and the State House in Boston, the "Colonial" house of Virginia or of Salem, and the pseudo-Greek mansion of the Middle Atlantic States are representative of the "architectural" type of this period, and I am not aware that all our enthusiasm for architecture in the past twenty years has produced anything better than these buildings and of scores more like them.

Of the second type, the utilitarian with more or less adornment, were the Italian "villas," the "swell-front" rows of red brick dwellings of Baltimore or Boston, the brownstone fronts of New York, the red-and-white of Philadelphia, and last and greatest in number the plain house of the small city or town, just the plain house; usually painted white with green blinds, often with a picket fence around it, with a one-story front porch or just a stoop, its gable usually to the street.

I respectfully submit that a village street of these houses, or a city street of the type of Chestnut Street, in Boston, is as well qualified to satisfy the seeker for truth and beauty as is the street, in town or city, which has drawn its inspiration from our architectural enthusiasms of the last five or ten years.

Our warehouse, our railway-stations, our factories, in fact almost all of our buildings in which the most rigid adherence to utilitarianism has been insisted upon, have gone on steadily improving for many years, excepting at intervals when some ill-advised corporation has endeavored to incorporate architecture into its advertising account, and even then the result is not always bad; for the corporation, probably realizing that it hasn't a soul, goes frankly to someone who has and gets him to use it. In no other class of buildings has the improvement in our architecture been so great as in these. If architecture as an art has little or nothing to do with them, so much the worse for architecture.

Let us have good architecture, by all means. Let us have all we can, so long as it is good or even not too bad, but because we have a Columbian, or a Trans-Mississippi, or a Pan-American, or a Louisiana-Purchase exposition, must we flood the country with imitations of various buildings designed for those events, imitations which bear about the same relation to the originals as a "frosted" souvenir-postal of the Jungfrau bears to the mountain itself? Because a reasonably intelligent and not too unscrupulous plutocrat employs an architect to design him a Georgian mansion or a Francis I. château, is it necessary for the suburban districts of all our centers of industry and commerce to plant rows upon rows of minute hybrids upon fifty-foot lots?

Time was when the church structure received our admiration, even the austere and meager temple of our puritan forefathers was architectural, but for the last half century what have we done? Perhaps the Catholic and the Episcopal churches have pretty generally escaped the contagion. But the others! Illustrated, the ecclesiastical portion of this article would be blasphemous; mere type being inadequate, the topic is dismissed.

Even granting that it is necessary to cover every building lot that modern real-estate experts can obtain building-loans upon with Queen Anne and colonial and California mission and English half-timbered detached and semi-detached villas and "bungalows" and modest and immodest "homes" and tenements, granting that this is inherent in our spirit as a nation with the Declaration of Independence behind it and the spirit of "get there" pervading it, granting this, must we add the reproach of hypocrisy by proclaiming, as we do, that all this is prompted by a love for the "beautiful and the true" in art? It may be legitimate, it is at least common, to talk poppycock as an aid in selling soap or health foods, but it isn't, or it ought not to be, nice to sell art or architecture in that way.

It is especially in the interior of the house, in its decorating and furnishing, that this spectre of advertised art stalks supreme. How many million feet of lumber have been consumed in slab-mission, fumed chairs and tables and settles? What tons of iron in fire-dogs and lanterns. What miles of old-terra-cotta burlap with dull green stencilings. The burlap I approve, however, for you can stick pins in it.

And we are doing it all "for love of art" and we know that it pays to advertise. But there are oases left still in this Sahara of "art in the home." Some one, somewhere, makes chairs easy-chairs, rocking-chairs, hour-glass chairs, and tables of willow, or rattan cunningly woven, which are light and comfortable; some one makes Austrian "bentwood" chairs, some one (and may he be blessed) makes large soft (not too soft) cushioned, round-backed, round-armed, leather-covered chairs with castors on them. I have never heard or read that any of these articles of furniture were made by people who had even the faintest perception of line or form as it should express itself when touched by the divine fire, but to paraphrase a rhyme addressed by our most reverend university to her sister next in age, I know that "wicker chairs were wicker when mission was a pup," and I hope that "bentwood will be bentwood when mission's burning up."

I think all of us are spending for "art" a whole lot of money which would better be devoted to home missions.

George Clarence Gardner.

Reinforced Concrete Building Construction[1]--IV

Mr. Hogue.—There is one thing which I should like to say, and that is, that I think sooner or later it is going to be much more the practice for an owner to go to an engineer and have his building designed before it is figured on. And when that is done we shall be in a position to do some things that we cannot do now. As it is now, when we contractors have to make our own designs and estimate on them in competition.

[1]An informal discussion before the Boston Society of Civil Engineers at its meetings held September 19 and October 5, 1906, published in the "Journal" of the Association of Engineering Societies for June, 1907, here continued from page 53, No. 1651.

we can't afford to put in any more steel than enough to keep the building up. I am looking forward to the time when owners will have buildings designed first, so that we can all estimate on the same reinforcement and have plenty of it. I think if there were rods at the tops of the beams they would take care of the strains arising from unequal settlement. Perhaps some of you noticed recently a picture of a building in Tunis, I think—a reinforced-concrete factory building, six stories high and about 50x100 feet, the foundation of which was entirely gone under one corner and the building was toppled over to an angle of 10 degrees; and yet the structure was standing there uninjured, except in the foundations, and they were going to jack it up and put a new foundation under it. It is a good example of what reinforced concrete will stand.

MR. PARKER.—I'd like to ask Mr. Hogue to tell us, in answer to the gentleman who spoke a minute ago, if his experience does not go to show that most of the buildings are designed now-a-days in the very way that he speaks of—that is, having plenty of steel in the top and bottom of the beams, and having them so that they are practically continuous beams?

MR. HOGUE.—There is almost always steel at the top of the beam over the support, and possibly for a little way out; but usually the middle half of the beam is without reinforcement at the top.

MR. E. R. OLIN.—At the last meeting, as I remember it, Mr. Hogue favored reinforcing columns by using hoops, while Mr. Wason did not believe in the use of hoops, but in the use of a richer mixture, and I think Mr. Worcester said that each had condemned the other's method in suitable terms. I wish each of those gentlemen would reply to the objections of the other to his particular style of construction of columns.

MR. HOGUE.—I am afraid the gentleman misunderstood me a little bit. What I said was that I hoped I might be able to favor a hooped column, because it seemed to give a smaller column to carry the same load than any other kind of design. I think, myself, the rich concrete column which we use in our practice has so far been the best, because we feel safest and surest of it and know the most about it. I think that when a rich concrete column gives too large an area, or on account of the difficulty of using two different mixtures in a building, the best way to increase the strength is by using compression rods, taking the bearing at the bottom with some sort of plate. But the objection I advanced to that was that there must be some way of distributing stresses from one tier of rods to the other, either by faced ends—in which case they should be put into a socket—or by a long lap to distribute the stress from one to the other; but both those methods are expensive, as is also a bearing plate at the bottom, and it seems to me that if it could be shown that the hooping of the column could be used, it would do away with a good many of those difficulties. But the question, with hooped columns, is whether the concrete will flow sideways without being injured, or whether it will disintegrate. If we could safely design it, I think there are great possibilities for the hooped column. The difficulty there, which Mr. Howard has brought out plainly, is that the richer the concrete the slower it is in stretching the steel hoop into tension, and for that reason you reach almost the ultimate strength of the concrete before that takes place. You can make concrete so rich that you can reach the ultimate strength before the hooping is much, if any, good. Then there is another difficulty—whether, if you use a mixture which will expand sufficiently to stress the hooping, it will not disintegrate. For that reason I do not think that hooped columns have been carried sufficiently far in tests to justify us in using them to any extent. But I hope something may be developed in that line.

MR. EDWARD S. LARNED.—I do not wish to add anything to the theoretical discussion of this subject at this time. Some important features connected with this work, however, have not been touched upon by any of the speakers, although I think you are probably all alive to them. In the course of ordinary work some of our pet ideas are very much upset.

At the September meeting of the New England Water Works Association the concrete-steel standpipe at Attleboro came up for discussion. In this work a high-carbon steel was used, and the standpipe was of circular construction, with diameter of 50 feet. It appears that they had much difficulty in bending the steel to the radius, and found it expedient to hold the rods together at the splice with guy-clips. There was a great deal of spring in the steel, however, and it was found difficult to keep the bars in position while the concrete was being placed, and Mr. F. A. Barbour, consulting-engineer, expressed the idea that in case the steel became displaced during the earlier hardening of the concrete it might, in reaching its final position, pull away from the concrete, leaving a void. This I have often heard suggested in connection with concrete beam and floor construction. A practice which is coming into much use to overcome the difficulty is to jar the forms with mallets while the concrete is in a semi-fluid condition. This seems to settle the steel into position quickly, and at the same time secure a very good bond between the rods and the concrete. I regard it as a most excellent practice.

I am very glad to know that the importance of the question of the consistency of concrete is coming to be more generally recognized. It was only a short while ago that engineers using concrete assumed that they could not get it too wet. In some cases they made no distinction between Portland cements and natural cements, using both of the same consistency—this, in the past few years, meaning very wet.

In speaking of the consistency of concrete, engineers express their views in such indefinite terms that it is difficult to determine, when a man describes a condition, just what he means.

It seems to me that in making concrete for reinforced structures it should be as nearly as possible scientifically, uniformly, and thoroughly prepared. We take great pains in fixing the dimensions of the gage box for sand and stone, and it seems to me that proportions of water should be as definitely fixed and kept within reasonable limits, depending on the size and character of the sand and stone aggregates.

The influence of mechanical mixing, contrasted with hand mixing, has a very important bearing on the consistency of the concrete and its appearance. For example, take hand-mixed concrete, where engineers require dry mixing before the introduction of water, then two, three or four turns; these turns with one gang of men mean one thing, and with another gang mean something entirely different. Some men are trained to turn it vigorously, others simply roll it over, and at best the mixing is very imperfect. In mechanical mixing this variation is avoided, and a more intimate and better mixture is bound to result.

In proportioning water for mechanical mixing, it is possible to use a less amount of water and yet produce a concrete of a consistency that would compare with hand-mixed concrete using a much greater amount of water. You will observe this fact if, after determining the amount of water to be used, you hold it in the mixer for a few extra turns and it appears much wetter than if you used more water and turned it out in a shorter interval of time. In other words, I advocate that the mortar in concrete should be of such consistency as to readily support the aggregate and cause it to cling together, and by a proper mixing with a moderate amount of water this will result in a concrete very plastic, easily flushed, productive of smooth exterior surfaces against the forms when properly handled, and resulting in the densest and, consequently, the strongest and most water-tight concrete.

When the question of introducing concrete through intricate reinforcement becomes serious, this must be met by reducing the size of your aggregate and perhaps making it slightly wetter, but carefully avoiding the sloppy condition which one commonly notes these days.

Because of the difficulties of handling and placing stone concrete about the reinforcement of the Attleboro standpipe, Mr Barbour has expressed the idea that had he this work to do again he might consider the use of a clear mortar, without coarse aggregate, feeling that by so doing there would be less chance of voids, and it would be easier to secure water-tight work.

MR. J. PARKER SNOW (*by letter*).—The remarks by Mr. Hogue as to the desirability of basing competition bidding on designs furnished by the owners, suggest the similarity of the business methods in building reinforced concrete at the present time with that of iron bridge-building thirty to thirty-five years ago. At that time the builders of iron bridges made nearly all of the designs, and they pinned their faith in the efficiency of their particular design to some patented feature, either in the form of the truss or some of its component parts, rather than to the weight of metal employed. In this we see a parallelism to the many styles of deformed bars and systems of reinforcement advocated by competitive concrete workers to-day.

Patented forms of structural-iron work passed off the stage years ago, and it is quite evident that reinforcing material for concrete is following the same route. Designs for steel bridge and structural work made by the owners are much more common now than in the early days, and the same will be eventually true,

without doubt, of designs for reinforced concrete. In the beginning of any type of construction it is natural that owners should wish to throw the responsibility of the design, as well as the construction, on the builder.

The system of construction wherein cast blocks of concrete are used for walls has not been touched upon in this discussion, so far as I have observed. It seems to me that a species of this system could be used to advantage where the walls of the building are made up almost wholly of glass, as is the case with the United Shoe Machinery Co.'s building, at Beverly, Mass., for example. Here there are pilaster columns about 16 feet apart, girders at each floor level, and the panel wholly occupied with glass. If the girders had been cast separately beforehand and set when the columns reached the proper height, a considerable reduction in the forms could have been made and some measure of allowance for contraction obtained.

As to the proper consistency for concrete, I think Mr. Wason's claim is just right. Concrete that is wet enough so that it can be properly mixed and made perfectly compact—that is, without air or water spaces—with reasonable labor contains water enough for complete hydration, which is all we need. By proper mixing I mean so that every side of every particle of the aggregate will be covered with the vehicle. Mr. Larned has well described the difference between good and poor mixing. The materials should be rubbed together. The hoe, if properly used, is a more efficient tool in the latter stage of mixing than the shovel. The analogy with paint mixing is quite pertinent. Most of us know the difference between paint when the dry pigment is simply stirred into the vehicle and when it is ground into the oil. In the case of concrete, the aggregate represents the pigment and the vehicle is the moist cement. Citing Mr. Larned's example, a batch of machine-mixed concrete may appear somewhat dry—that is, it looks friable and brittle; with a few more turns of the machine and no addition of water it will appear much more wet. This means that the last turns have plastered all sides of every atom of aggregate with a uniform coat of moist cement. It now has a different color and sheen from what it had before; it looks pasty; it has passed a point analogous to the point of recalescence in highly-heated steel; it has come to nature, as old masons say. Concrete will bear many abuses and still be good stuff, but its strength depends in some degree on proper mixing.

The proper packing of concrete has been touched upon. I believe that jarring or quaking is the most efficient. A light rammer set on the surface and rapidly pressed down and raised enough to quake the mass, without raising the rammer from contact with the surface, is very effective. Our member, Mr. William B. Fuller, calls this "joggling," which perhaps applies best to large masses where rubble plums are used. The object is to get all the air and surplus water out of the mass, and a sharp, continuous agitation is more effective than blows from a rammer.

Old Inn Signs

FOR many centuries no other sign than the bush—a bunch of ivy or evergreens—hung over the doorway of town and country inns alike. The bush was very common in ancient Rome. Its popularity seems to have spread in all the provinces of the old Roman Empire, and it remained a distinctive inn sign in these islands and on the Continent ever since.

But while the roadside hostelries were content with a bunch of foliage, more distinctive signs became necessary in towns and cities, where taverns or inns were often in close proximity.

Arms, badges and crests of the noble lord whose residence was near the inn would usually be put over the door to attract his numerous retainers or partisans. Thus at Lewes the Three Pelicans took its name from the fact that these birds constituted the arms of the Pellham family.

In many cases, however, the innkeepers as well as the travelers, being unacquainted with the mysteries of heraldry, lion gules or lion azure went by the name of Red Lion or Blue Lion, while the two leopards argent in the arms of the Dorset family were familiarly called the Cats. The numerous lions, bulls and dragons of all shades, as well as magpies, crosses and crescents, which have survived to the present day, have all some heraldic origin.

The royal arms were, of course, a favorite sign then as they are now, and the crown is undoubtedly one of the oldest English signs. In 1497 a certain Walter Walters, who kept the Crown in Cheapside, lost his life for having made the innocent cockney pun that he would make his son heir to the Crown.

The different kings and queens' heads which have adorned English inns for the last five centuries are too numerous to record. Henry VIII. and Queen Elizabeth have been by far the most popular figures of all royal modern signboards, the former being usually represented as a merry, bloated Bacchus, the personification of jollity and good cheer.

After royal and heraldic signboards, none was more numerous in mediæval England than those of a religious character. Besides the numerous church, church gates and church style inns which are still to be met with in the country there were many dedicated to the Virgin, saints and dignitaries of the church.

The salutation was a very popular sign in pre-Reformation times, representing the annunciation of the Virgin Mary. Even now this sign is still to be seen, one of the best hotels in the Lake district displaying it to this day. But it was almost universally changed soon after the Reformation for the angel, the Virgin Mary being painted over, the Angel Gabriel left alone on the board.

Curiously enough, many other tavern signs of Catholic England retained their popularity during and after the Reformation. Such are the cross keys, a sign which is far more uncommon now, and which is intended for the keys of St. Peter, the papal arms.

The Pope's arms and the Pope's head also survived the Reformation ; there were four Pope's head taverns in London in 1636, the most famous of which was that in Cornhill, which dated back to the reign of Edward III. and was not definitely pulled down until the close of the eighteenth century.

The Cardinal's hat was the sign of a London tavern situated in Lombard street in 1459. This sign became common when the popularity of Cardinal Wolsey was at its height, but there are no such signs in England known to the writer at the present time. Not so the signboards representing saints and martyrs.

St. George, with or without a dragon, is the most popular in England, and St. Patrick in Ireland, while the Scots are fond of raising St. Andrew to the dignity of a public house sign, the same being also true of the Welsh saint, David.

One of the old religious signboards, the origin of which is not commonly known, is the Catherine wheel, sometimes degenerated into the cat and wheel, which was originally intended as a dedication to St. Catherine. This martyr was placed between wheels armed with spikes, a device which was adopted in the Turners' arms.

St. Martin, the patron of vinters, was often to be seen in signboards, as also St. Dustan, St. Luke and many others. One of the signs under which some of the most famous of English taverns have flourished is the Mitre. The most famous was the Mitre, in Mitre court, Fleet street, one of Dr. Johnson's favorite haunts, where Goldsmith and the other literary celebrities of the day used to meet.

There are quite twenty Mitre taverns of more than passing interest, either from a literary or a historical point of view, which shows what a general sign it was. In the *"Quack Vinters"* (1712) the reason of the partiality of the tavern keepers for this sign is explained as follows:

May Smith, whose prosperous Mitre is his sign
To show the church no enemy to wine.
Still draw such Christian liquor none may think
Tho' e'er so pious, 'tis a sin to drink.

Besides royal, heraldic and religious emblems, innkeepers adopted at a very early date as a sign the arms or badge of the class of customers they particularly wished to attract to their house; thus he who wished for the patronage of soldiers would hang two crossed swords as a sign, while another whose tavern stood near the wharf or quay would attract sailors by choosing a ship or the head of some famous naval hero.

As the population increased so did the number of inns and taverns and signs became more and more diversified. Reading being a scarce acquirement, the innkeeper always endeavored to catch the eye of the passersby with an easily understood picture and one, at the same time quite distinctive from any of the surrounding houses.

Some would put up their own name in the shape of a rebus picture, two cocks standing for Cox, a hare and a bottle for Harebottle, while many individuals named Fox, Bell, Bull, etc., would put up a fox, one, two or three bells, or a bull of blue, pied or red, respectively, as a sign.

Most of these names being common, some other sign had to be added to distinguish the inn of John Fox from that of Robert Fox or Thomas Fox. The result was a great diversity of more or less incomprehensible double signs, such as the following: Fox and Cap, Fox and Crane, Fox and Crown, Fox and Duck, Fox

and Goose, Fox and Knot, Fox and Owl, Fox and Punchbowl, etc., also the Bell and Candlestick, Bell and Blackhorse, Bell and Anchor, etc.

Later, however, the ever-increasing number of taverns forced the landlord to adopt more original signs than those derived from heraldry, the saints or dignitaries of the church, or his own name. The animal kingdom was ransacked—quadrupeds, birds, insects and fish, the vegetable kingdom, from the palm to the daisy—everything on earth and in the firmament above it was put under contribution.—*Wine Trade Review.*

Agents Used in Determining the Potability of Water[1]

TO ascertain whether a given source of pollution can affect a given well, it is usual to introduce some chemical at the point of suspicion and then to examine the water at frequent intervals to ascertain whether the chemical selected can be detected in it. For this purpose common salt (sodium chloride), a lithium salt or a dye named flourescein have been employed; and recently the author has used ammonium salts, since, in certain cases, they possess advantages over the other. Sodium chloride is used chiefly because it is very cheap, easily obtainable, quite innocuous and easily detected and estimated in the water. As all waters contain chlorides, the normal chloride must be first ascertained, then any subsequent increase during the experiment may be attributed to the salt used. Slight variations are often observed in water from the same well; consequently, enough salt must be added to produce a more marked effect than any recorded in the normal water. The quantity must be at least equal to 1 grain of salt per [Imp.] gallon (= 0.6 gr. Cl.) Should it prove necessary to add this amount to a large quantity of water, the weight of salt used must be considerable, and a substitute for salt would be used.

A salt of lithium has frequently been used, but, owing to its cost and the difficulty of detecting it in water, it is now rarely employed.

The author has recently used ammonium chloride (sal ammoniac) in several investigations with marked success. It is very cheap, free from color, perfectly harmless, and the ammonia, even in great dilution, admits of easy detection and estimation. When seven pounds, costing about 3s. 6d. (85 cents), is dissolved in 1,000,000 [Imp.] gallons of water the ammonia can readily be detected. The amount of ammonia present in all good subsoil waters is too trifling to interfere. But certain very deep wells yield waters and many polluted waters contain very varying quantities of ammonia; hence, in some of these cases, the use of an ammonia salt might not lead to definite conclusions. It must also be remembered that the salt must be put directly into the subsoil water or fissure, as if spread on fertile ground a portion of it might be nitrified by the nitrifying organisms of the soil. Probably, however, in any case the amount nitrified would only be an infinitesimal portion of the salt employed. On the whole, it may be regarded as much more convenient for use than either common salt or salts of lithium.

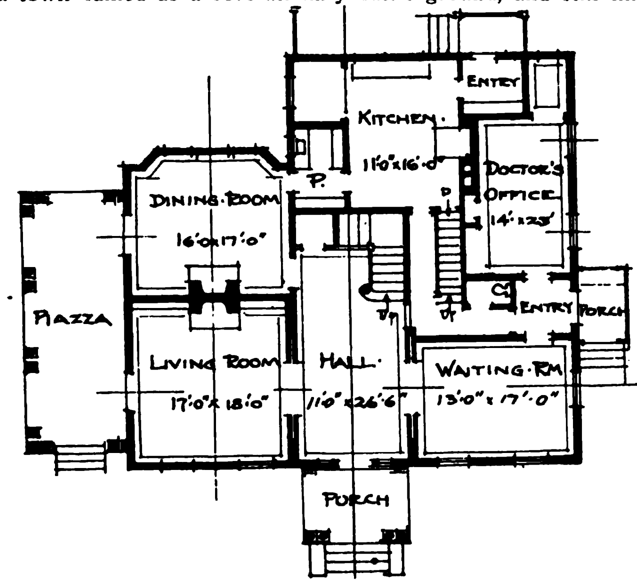
Another substance, of an entirely different character, which is of special importance in such investigations as the above, is a coloring matter called fluorescein. Many of the aniline dyes possess enormous colorific power; but most of them, when in very dilute solution, are decolorized by filtration through soil, and others are too expensive or are objectionable in other respects. Fluorescein appears to be unaffected by passage through chalk, sand, surface soil, etc., and when dissolved in water by aid of an equal weight of caustic soda it can be easily detected by its fluorescence when the dilution is 1 in 100,000,000. Under very favorable conditions 1 in 200,000,000 may be detected; in other words, one pound of fluorescein will distinctly color 10,000,000 gallons of water. As the demand for this substance has increased the price has gone down, until it can now be purchased at 7s. 6d. (1.82) per pound, in quantities of ten pounds and upward. The relative cost of these various substances, used in sufficient quantity to affect 1,000,000 gallons of water, would be: Fluorescein, 9d.; common salt, 2s.; ammonium chloride, 3s. 6d., and lithium sulphate, 40s. (or as 9 to 24, 42 and 480). Fluorescein is, therefore, much the cheapest; it is the easiest to apply, and far the easiest to detect. There is only one possible objection to it, and that is that, if used incautiously, it may so color the whole of a water supply as to cause alarm on the part of the consumers. For this reason it is in most cases preferable to use salt or ammonium chloride in the first instance; and if, when used in moderate quantities, these give no definite results, to employ fluorescein. This dye has been largely used for tinting underground streams to trace their course, and to a certain extent for determining the direction and rate of flow of subsoil water, and one case is recorded where it unexpectedly made its appearance in a public water supply and caused considerable astonishment and some alarm.

[1]Extract from a paper by Dr. John C. Thresh, read before the British Association of Water-works Engineers at Windsor, Eng., June, 1907.

ILLUSTRATIONS

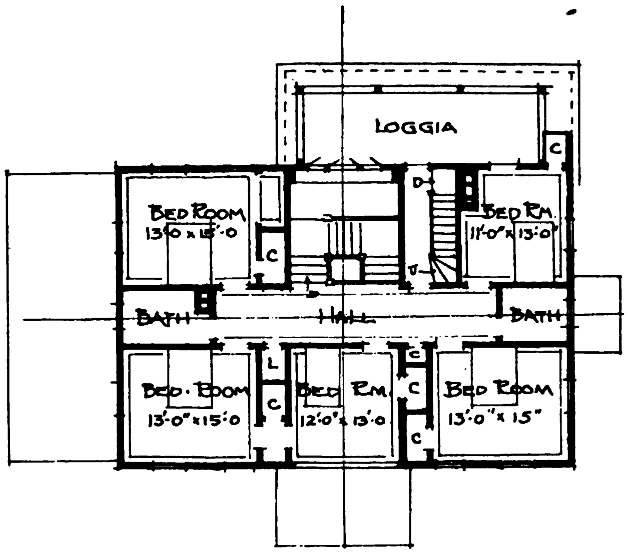
HOUSE OF DR. IRWIN, WHITE PLAINS, N. Y. MESSRS. PETRY & SAYWARD, ARCHITECTS.

The house here illustrated is located at White Plains, N. Y., a town famed as a revolutionary battle ground, and still linked



with the past through a few surviving landmarks of Colonial days. The site itself overlooks the "Village Green" of our ancestors, or what is essentially a broad avenue, over-arched by rows of stately trees. Few circumstances could be more conclusive as to style or more inspiring to the mind of the architect, especially when coupled, as in this case, with that *sine qua non* of successful house-building, the full accord of the client.

The arrangement of plan was a natural outgrowth of condi-



tions imposed by the combination of requirements for a doctor's office and family apartments. The distance required in tests of the eye established of necessity the long dimension of the office,

and for obvious reasons, a special entrance was required which should communicate directly with the doctor's office, waiting-room, and service hall. At the same time, it was desired that the waiting-room should be so located that upon occasion it might be thrown into the family apartments. The typical Colonial plan has lent itself readily to these requirements, and the exterior treatment is therefore a natural and consistent development marked for its restraint and well studied proportions. The familiar forms of the period appear in the wide clapboards, balustrades, and refined detail, and the whole composition is brightened by a well judged disposition of lattice work. The gambrel roof serves to amplify the attic space, and at the rear drops in a low sweep to cover the kitchen extension. Into this sweep, at the second floor level, is cut a loggia, designed primarily as an out-of-door sleeping apartment, but so popular has it become that it serves during the day for an open-air living-room as well.

As one enters the house the spacious hall, unencumbered by the modern interpretation of the vestibule, gives rise to the impression of wholesome hospitality, and serves as a fitting introduction to the simple and consistently designed interior. The wood-work is painted white, the doors are of mahogany and delicately detailed plaster cornices are used throughout. The stairs rise by easy stages and at the second landing is introduced a broad platform or gallery serving both as a point of vantage and as a means of access to the loggia.

Green is the prevailing tone of the first floor wall decorations, broken by the introduction of yellow in the dining-room and blue in the doctor's office. To complete the scheme harmoniously, Colonial forms have been adhered to as strictly as possible in the furnishing.

OFFICE BUILDING FOR THE MECKLENBURGH REAL ESTATE CO., NASHVILLE, TENN. MESSRS. CARPENTER & BLAIR, ARCHITECTS, NEW YORK, N. Y.: FOUR PLATES.

ROYAL INSURANCE COMPANY'S BUILDING, WILLIAM STREET AND MAIDEN LANE, NEW YORK, N. Y. MESSRS. HOWELLS & STOKES, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

Additional Illustrations in the International Edition.

MAIN ENTRANCE: ROYAL INSURANCE COMPANY'S BUILDING, NEW YORK, N. Y. MESSRS. HOWELLS & STOKES, ARCHITECTS.

The building is located on the northeast corner of William Street and Maiden Lane, and occupies an irregular plot approximately 70x101 feet. The peculiar angles of the intersecting streets at this point permitted the somewhat unusual location of the main entrance at the corner of the building, and this entrance and the corner treatment of the design has been emphasized throughout the height of the building.

The exterior design embodies a base consisting of four stories of white Georgia marble, a shaft of ten stories constructed of soft-colored red brick laid in white mortar and bonded to show a diamond diaper-pattern, which emphasizes the lines of the mortar and carries throughout the surface the feeling of light color which is emphasized in the base and the upper stories. Above the red brick shaft occur three stories of ornamental glazed terra-cotta work, crowned by a balustrate of the same material. Heavy projecting courses have been avoided, and in the upper stories a pleasing treatment of polychrome terra-cotta has been used.

Directly above the entrance, and forming a part of the entrance treatment, are the arms of the Royal Insurance Company, reproducing the lion and unicorn which form a part of the Royal Arms of the United Kingdom, and replacing the shield by a marble and bronze clock-face eight feet in diameter.

The construction of the building is the highest type of steel-skeleton frame, with terra-cotta floor-arches, having finished floors of cement, marble and mosaic.

The power equipment of the building consists of a complete plant for the generation of heat, electric light and ventilation, together with four high-speed hydraulic passenger-elevators. The electric wiring installation is unusually complete, and special arrangements have been made, by means of sub-panel boards located at several points at each floor, for the convenient connection of telephone and call-bell systems as required by the various tenants throughout the building.

The corridors throughout are provided with marble mosaic floors and marble wainscoting; and the first floor lobby and entrance corridor, extending through the mezzanine story, are elaborately finished in white marble, with ornamental plaster ceilings and leaded glass lunettes and transoms. The interior wood-work throughout is fireproofed material and consists of quar-

WILLIAM STREET ENTRANCE: ROYAL INSURANCE CO.'S BUILDING.

tered white oak, birch and East India mahogany or vermillion wood.

The Royal Insurance Company occupies the entire sixteenth and seventeenth floors and a large portion of the first and mezzanine floors.

NOTES AND CLIPPINGS

THE KAISER'S ART.—No department of the multifarious activity of the German Emperor has been more discussed than his patronage of the arts, and much criticism has been exercised on the numerous monuments and public buildings in which his ideas have been put into execution. What may be regarded as an Imperial apologia, as far as these things are concerned, is shortly to appear in the shape of an elaborate book by Prof. Paul Seidel, curator of the artistic collections in the royal castles, and director of the Hohenzollern Museum. This work, which tells the story of the Emperor's relation to the arts, and expounds the principles which have guided him, will contain forty-six original paintings, drawings, and designs by his Majesty's own hand. A writer in the courtly *Lokalanzeiger*, which has been favored with advance proofs, remarks:

"As these are not completed works, executed with the assistance of the living model, but only ideas of the moment, they will appear to the lay eye hasty and inexact. To the connoisseur, however, they are proof of extraordinary acquaintance with the nature of sculpture, painting and decorative art. In many sketches for theatrical scenes, the difficult problem of presenting masses of people in active movement is cleverly solved."—*London Telegraph.*

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NOTES AND CLIPPINGS. 80

IT seems to us that no untoward occurrence of late years has given so heavy a jolt to the science of engineering as the collapse last week of a portion of the great cantilever railroad bridge over the St. Lawrence, at Quebec. Doubtless, the patient and exhaustive examination of the ruins and inquiry into the observed phenomena that attended or preceded the collapse will result in arriving at a general agreement as to the probable cause or causes, but only a negative satisfaction can be derived from such a finding, as there must always remain a more or less well defined and active suspicion that, after all, the accident was really due to some other defect or error. If a similar accident had befallen the Firth of Forth Bridge, it might have been dismissed with an "I told you so, for no bridge-builder had a right to undertake so dubious an experiment." But with the success of the great Scottish bridge before the mind, even although the span of the Quebec bridge was to be somewhat greater, there will be a general disposition to demand that the designers and engineers of the latter structure shall clearly establish the adequacy of their design and the fullness and accuracy of their computations before it is decided that the blame must be placed, where probably it will finally rest, on the shoulders and consciences of the physical erectors of the structure.

IF there is anyone engaged just now in the search for "the American style of architecture," he must be conscious that there are in the field against its development two very active opponents. In the van, and so most in evidence, will be noted the ever-increasing ranks of the adherents to and advocates of the tenets of the École des Beaux-Arts, but behind them, less observed, but possibly more potent because more pervasive, surges the inky output of the German publishers of architectural books and periodicals, who just now are devoting themselves with ardor to the exploitation of every and any manifestation of l'Art Nouveau, as conceived by the German mind, that their agents and photographers can bring within their reach. Now, when the German mind turns to toying with architectural forms, where grace of outline and balance of composition are important considerations, it is capable of producing results that shock the sensibilities because of that certain needless introduction of barbaric complication and bizarre eccentricity of line and form that it has manifested throughout the ages. Yet often, even generally, there is discernible a basic idea, of strength and masculinity, which deserves to have a better fate, which can be sorted out by a clear-viewed and sane designer, developed and brought to a real success, and it is only fair to acknowledge that in the matter of l'Art Nouveau some of the Teutonic experimenters are showing a greater aptitude for getting real architectural effects that will stand the test of time than those designers who are working along French or Belgian lines.

BUT it seems to us worth while to draw attention to the fact that the development of architectural design everywhere is exposed of late to a Teutonic influence that gains strength with each year, and this may be said without necessarily conveying the implication that we feel that such influence is unfortunate and undesirable. It proceeds very directly from, and is due to the fact that the output of architectural books and periodicals by German publishers is seemingly as great as, if not greater than the combined output of French and English publishers, and as the Germans, besides being, as it is quite proper the countrymen of Fust and Gutenberg should be, admirable printers, are also excellent salesmen, their wares are pushed with ardor; and as many of the most successful handlers of architectural publications in this country are Germans, it is not unfair to imagine that they have a greater sentimental if not commercial interest in selling books of German origin than those issued by the Paris or London press.

IF anyone should think this word of caution is quite unnecessary, we will ask him to take a stroll through the side streets of upper New York and Harlem, for there, if he knows the architectural books that in the last twenty years have been found "good sellers," he will find set before him in well-defined strata evidence of the vogue of Collings, of Liénard, of Revoil, of Viollet-le-Duc, and more besides. Particularly deplorable is it that the easily followed plates of the griffen-haunted Liénard ever reached this country, for, carved in all degrees of excellence and at all sorts of scales and sizes, on the sandstone fronts of Harlem houses there are enough griffens, dolphins, phœnixes, lions, bears, leopards, birds and squirrels, of impossible anatomical and zoological form and combined with all sorts of extraordinary scrollwork and

foliage, to furnish the good citizens of the neighborhood with perpetual nightmare and æsthetic indigestion. If, nowadays, the publications that are so actively exploiting the work of the German experimenters in l'Art Nouveau should have a similar vogue in this country, it is possible that the result might be equally to be deplored.

IT is agreeable to find it reported that Mr. J. P. Morgan and Mr. G. S. Bowdoin have contributed to the building-fund of the Cathedral of St. John the Divine nearly two hundred thousand dollars, in the expectation that the sum will be enough to build the other tower piers and complete the crossing within the next three years. As the work on the choir has made good progress this summer, those with strong imaginations can now begin to picture the effect of the building when seen near at hand from Morningside Avenue.

IT is agreeable, too, to learn that a good deal of work is being done within the walls of St. Patrick's Cathedral, New York, that will have the effect of bringing its rather barren interior into greater harmony and better keeping with the beautiful Lady Chapel now nearly finished, a step that will make unlikely the recalling hereafter of the old adage about new wine and old bottles. Among the important changes and additions are new seatings and pavement, a bronze choir screen and costly altars for the Chapels of St. Michael and St. Joseph, so that when, within a few months, the building is at length consecrated it will have a finish and completeness that befits the original design and the great congregation of a metropolitan city. It is a misfortune that a really fine interior must always be marred by the sham vaulting, but it can safely be predicted that before many years have passed the two shapeless clergy-houses that now spoil the east end of the building will be removed.

DURING the last month there died, in his seventy-ninth year, at Wannsee, Prussia, an architect of international reputation and of international execution as well, seeing that the work for which Professor Hermann Ende was best known, outside of Berlin, is the series of important buildings he designed and executed—in conjunction with his partner, Herr Boeckmann—for the Japanese Government; these consisted of the Imperial Palace, the Houses of Parliament and the Ministry of Justice, at Tokio. Besides carrying on a large and active private practice in Berlin for more than forty years, Herr Ende was also Professor of Architecture at the Berlin Technical High School, and had been President of the Royal Prussian Academy of Arts.

A VERY curious case was reported in the New York papers a short time ago which is worth while recording, although we do not know what the result is to be. Whether, or how, the provisions of the contract-labor law shall be enforced seems to be largely a matter of chance, or more probably of political favor. Architects know by this time that they should not give any definite pledge to any foreign artisan, possibly even any artist, assuring him employment at a price if he will agree to emigrate to this country. But we fancy that architects would feel that they may properly and safely publish in the public press an announcement, addressed to the world at large, promising employment to any artisan unspecified by name who, possessing the desired training and skill, is willing to leave his foreign home and settle in this country. It appears, however, that this seemingly innocent and usual commercial procedure may be prohibited by the contract-labor law. Recently, the proprietors of a lace-making establishment at Newburgh, N. Y., found themselves in need of an expert weaver, and advertsed their need in the proper English medium. Presently there tried to enter this country, via Ellis Island, the very man who was needed, attracted hither by the advertisement in question and seeing no reason why he should not confess to the immigration authorities how and why he came. Unfortunately, the Weavers' Union, possibly being a subscriber to the medium in question, had cognizance of the advertisement, and were on the watch for such fruit as it might bring forth, and, so, easily persuaded the authorities that the expert weaver must be kept out. The case was contested by his would-be employers, however, but we do not know how it has resulted.

IN these days when so much disputation is going on in this country over the habits and actions of beasts and birds, it might be well to overhaul the evidence and inquire whether, after all, the downfall of the Tower of St. Mark, at Venice, were not due to the pampered flocks of pigeons that frequent the Piazza di San Marco. We find a reason for the suggestion in the New York *Sun*, a newspaper that boasts of the accuracy of its statements, wherein we noted, the other day, a report from the town of Warsaw, Indiana, which declared that pigeons and sparrows had brought the Kosciusko County Court-house into parlous condition. It seems that these inconsiderate birds have been long in the habit of procuring the gravel they need in carrying on their digestive processes by picking geologic specimens of the right size from the limestone columns of the Court-house front, until now "many of the pillars on the second and third floors have been more than half eaten away"! Wood-wasps, squirrels and wood-peckers have long been known as foes of summer cottages, but on less impeccable authority than the *Sun* we could not have believed the gentle dove so destructive of masonry. Perhaps the explanation is that the court-house is wholly given over to divorce cases, and in such case the rage of Cythera's favorite steeds would be understandable.

THOSE who have an interest in expositions and like to arrange their outings and travels so as to enjoy as much of their assorted sights and charms as strength and time will allow, should keep in mind that the "Exposition de l'Entente Cordiale" is to be held in London in 1908, and that, though it is to be confined to French and English exhibits, it is to be the largest exhibition held in London since the great Exhibition of 1851. Besides this, Japan is holding a series of preliminary provincial expositions preparatory to opening a grand international affair in 1912. Between these two will occur, at Seattle, one of our own seemingly endless series of world's fairs. This one, the "Alaska-Yukon-Pacific Exhibition," whose special purpose is declared in its name, is to be held in June, 1909.

Italian Tombs—I

GOTHIC

FAR be it from me to attempt to place before the readers of *The American Architect* a study, however summary, of art as it is found expressed in Italian tombs. An entire issue—nay, much more than that—would have to be devoted to so long a task, for the funerary art of Italy is such that every epoch demands attention for the large number of its tombs of the highest artistic merit. If my intention were not altogether modest, I should have to begin with the Etruscan tombs, not to speak of those tombs of ancient Italy with their cone-shaped mounds to-day become almost formless and indiscernible.

In speaking of the Etruscan tombs—veritable houses of the dead—I should have to write of their decorative painting, that essential element of the funerary art of our people, so energetically developed before the all-powerful influence of Hellenism made itself felt. I should have to mention the tombs at Norchea, Vulci, Cervetri, Corneto, Veio, Chiusi, Orvieto and the mural frescos that decorate the tombs in these ancient cities, with their simplified drawing, the movement of the compositions and the life-like gestures of the figures. I must not attempt this evoking of a far-distant past, just as I also must renounce the idea of describing the monumental tombs of the Roman period, which followed chronologically the times of the Etruscans. Besides, the mausoleum of Cæcilia Metella on the Appian Way, and the sumptuous mausolea that Augustus and Hadrian caused to be erected for themselves and their families are very well known, and we can get along without telling twice-told tales. Perhaps it may be worth while to mention the pyramid of Caius Cestius, a tomb now unique in Rome, but which formerly had its fellows, the caprice of a rich man inspired by the monuments of Egypt, at that time a recently-conquored country; and amongst the sepulchral phantasies of Rome it may be well to recall the tomb of Eurysaces, near the Porta Maggiore. This is the tomb of a baker and his wife—a baker who had the contract for furnishing bread to the apparitors of the magistrates, and so became a person of consequence, and naturally wished to build a tomb worthy of himself and his fortune. The tomb was built and was ornamented with several baskets of bread and three rows of bas-reliefs that depicted the making and sale of bread.

Not to leave Roman art just yet, Pompeii, in its celebrated Street of Tombs, offers a complete collection of sepulchres of divers forms, chapels, altars, semi-circular stone seats, etc., to which modern art, embarrassed in its search for new sepulchral forms, has turned more than once. But if the principle of imitating past styles must be accepted and for awhile hold the upper hand—a principal which, as my friends very well know, I do not myself uphold—Italy has other sources of inspiration, richer and better, to which one can turn. I do not refer to the Paleo-Christian tombs, the subterranean cemeteries, the sarcophagi, where the arts of paganism still have play. I refer to epochs much less remote, which, after all is said, respond better to our æsthetic habits and our feelings. I mean the Middle Ages, the Renaissance and Modern Times, as far down as Canova. Here are to be found an undreamed of wealth, an undefinable variety of tombal forms, on which the taste of Italian artists, as they succeeded one another, has impressed an attractiveness, a grace, a *cachet*, that is altogether personal. All sorts of different materials have been used in this funerary art, from marble to stucco, from terra-cotta to stone, from mosaic to bronze. And, generally speaking, the art preferred has been architecture—a preference to-day reversed, when sculpture imposes its will on the *"ars regina."* That is to say, architecture almost always plays a preponderating part in Italian tombs, as compared with the carved work of the ornamentalist or the statuary. And yet the fusion of the work of the handlers of the compass and the chisel sometimes invites the cooperation of the brush, and, as I have said, the rôle in Italian funerary art played by painting is more remarkable than many people suspect. In two ways painters lent their aid—first, in the way of historical compositions, and, secondly, a more modest way, by coloring the materials of which the actual tombs are made, and from this coloration marble is not to be excluded, for during the Middle Ages and the Renaissance marble frequently was painted and gilded; and if this is true of marble it is still more true of terra-cotta, which was almost always painted. There are those, however, who disbelieve that color was used on the tombs, just as they are sure that polychromy was not practised in Greek architecture. The artificial coloring of marble, stone and terra-cotta had the result that, in a time not, alas, very far removed from the present, an attempt was made to remove the color from a famous Gothic altar-piece at Bologna, by the Venetian sculptor Delle Messegne, on the assumption that it was a superfetation of Baroco times. And yet the polychromatic sculpture of the Della Robbias owes its birth to the colored terra-cotta that was common before Luca made his experiments in clay enamels. The color laid on actually with the brush has little endurance, and so monumental decoration has benefited by the Robbias' discoveries. To the fact that paint is perishable is owing in a great degree the opposition of those who disbelieve in the practice of polychromatic decoration in Italian art, and it really is difficult now-a-days to discover a single monument that preserves its original coloring; all that we see to-day are a few traces of color here and there on the most protected portions of monuments that used to be resplendent with color. The effect was simple, but grand, for never did the architectural coloring of the tombs, altars, ciboria, etc., aim to fill the gaze with a tumult of color: in general, it was a matter of azure and gold; and, by the way, the church of the Eremitani, at Padua, contains tombs wherefrom the azure tint has not yet vanished under atmospheric action. And as for Venice! How many tombs are there there that do not preserve traces of their once beautiful polychromy? In a general way, one can feel assured that up to the time of Michael Angelo the brushes of Italian painters found work to do upon Italian tombs. After that the luxury and pomp of the seventeenth and eighteenth centuries replaced the modest efforts of the painters with the natural polychromy of colored marbles.

All this is said looking at the matter from the pictorial point of view, a point of view that is almost *"inédit,"* for it is customary with us for writers to neglect the artificial coloring of our monuments, writers who, in general, merely repeat what some earlier writer has said, or, at best, consult the archives now and then, but rarely actually examine the painted or sculptured object itself.

The Gothic period was an age superb in artistic tombs, and Italy—although in the development of the style it cannot be compared with France—has some monuments of a perfect beauty.

You must go to Verona and to Venice, and you must descend the Peninsula from Bologna as far as Assissi and Naples, and as in the cities here named you will encounter such a collection of tombs as will fill you with surprise, I do not mention cities of secondary importance, such as Arezzo, neglecting even Milan, and such as Pistoja, where the Gothic masters left in the matter of tombs many that no one could dare to rank amongst the least deserving—the tomb of Cino Sinibuldi, in the Cathedral, for example.

But before entering on particulars, it is well to separate into two classes these artistic tombs, whether Gothic or Renaissance, the tabernacle tomb and the tombstone proper, the slab or ledger tomb, and to these can be added the simple mural tablet, more often used in Italy during the Renaissance and Baroco periods than during the Gothic period, as the most interesting tombstones have been conferred on us rather by the Renaissance and the Middle Ages than by more modern times.

Several Italian churches are decorated both with ledger and with tabernacle tombs (formerly intra-mural sepulture was allowed), and these tombstones are carved and incrusted, the full-length figure being shown on the bed of death in a relief that is ill fitted to its position in the pavement. Yet it must also be noted that these tombstones sometimes projected above the surface of the pavement, so that they might be protected from the wear and tear of the feet of the faithful as they irreverently tramped over them.

It was about 1566 that Pius V., turning his thought to this

arrangement, ordered that these tombstones should be moved so that they might be placed beyond the risk of further damage, and that circulation over the church floors might be freer. So some of these stones were lowered flush with the pavement, while others were placed vertically along the interior walls of the sacristies of churches and convents.

The sarcophagus is the fundamental concept of the tabernacle tomb, and the couchant figure is the direct consequence of the former general use of sarcophagi, and both during the Gothic period and during the Renaissance the sarcophagus is surmounted by a tabernacle or tent, the artist sometimes creating a composition that is borne upon consoles, as in the case of the tomb of Beato Pacifico Buon, in the Church of the Frari at Venice, a prodigiously sumptuous affair, or he arranges a design with a wealth of columns and pilasters, as in the case of the two most exquisite Gothic tombs in all Italy, namely, that of Can Signorio at Verona and that of Niccolò Specchi at Assissi.

The tomb of Beato Pacifico Buon (1437) recalls the ornamental treatment of the Porta della Carta[1]—the noble exuberance of sculpture, the little angel-musicians which follow the lines of the pointed arch are superb in their execution, and the man who carved them is the same Bartolomeo Buon who endowed with beauty the magnificent entrance to the Ducal Palace at Venice.

TOMB OF PAOLO SAVELLI, STA. MARIA DEI FRARI, VENICE.

More highly wrought, more complex and far otherwise celebrated, the tomb of Can Signorio is the most admired of the funeral monuments of Gothic Italy. It, though not the oldest, dating only from 1375, towers above the other tombs of the Scaligers in the little enclosure near Sta. Maria Antica. The chef d'œuvre of Bonino da Campione, it has a value as composition and as execution that cannot escape the reader. The horse that crowns it seems to prepare the way for those other tombs where the equestrian figure plays its part, being in fact far more in evidence than this figure of Can Signorio. Such a motif is rather indicated for the tombs built by the State in honor of its generals, and so Venice adopted the equestrian figure for the semi-Gothic tomb of General Paolo Savelli in the Church of the Frari, a name which, when it is a question of funerary art, must always be associated with that of SS. Giovanni e Paolo, for these two Venetian churches contain the most imposing tombs in Venice, a city so rich in monuments of this class. In the Savelli tomb, to the grandeur of the equestrian figure is added the energetic liveliness of the smaller figures about the base of the statue which the Pisan statuary evoked in all their beauty. The Virgin and Child in the middle will at once call to mind the characteristic group in the Cathedral at Prato, so well known to amateurs of the Italian Trecento.

I must not leave northern Italy without remarking on the gilding that used to embellish the tombs of the Scaligers, including that of Can Signorio and the other tombs mentioned, including also a succession of Gothic tombs in various parts of Venetia which I have not named, such as that of Duccio degli Alberti (1336) in the Frari; that of Arnoldo Teutonico, a general whose armor is in blue and gold with azure enhancing the architecture; the tombs of Francesco Dandolo, of Jacopo Cavelli, of Tommaso Mocenigo, all ornaments of the above-mentioned churches wherein color played a magnificent rôle.

For the sake of brevity, I forebear to mention Verona and Padua, where in the Church of the Santo are two notable polychromatic sarcophagi in the Chapel of S. Felice, and in the Eremitani the tomb of Ubertino da Carrara is also largely gilded, recalling the school of Delle Messegne, the authors of the altar to S. Francesco de Bologna, which my readers know.

Now let us turn to Arezzo, and the terra-cotta tomb of Roiselli, in the Church of S. Francesco, the remarkable work of a votary of the Aretine Niccolò de Lamberti's (middle of the sixteenth century). The prone figure of Roiselli ranks full high in the firmament of beauty, and this Niccolò, a little-known artist, is one of the earliest sculptors of the Quattrocento whose authority had influence with his successors. Here are to be noted certain Baroco tendencies in the *quattrocentesco* ornamentation, typical none the less of a transition to which Italy, and Venice in particular, owes superb examples.

Naples, which like Rome is not a Gothic city, must here have our attention because of a series of majestic tombs in the Gothic style. In the splendid atrium of the Church of Sta. Chiara there are the tombs of the Angerin kings, marble monuments with sculptured sarcophagi, and in the Church of S. Giovanni à Carbonara the tomb of King Ladislaus is of extraordinary architectural richness. The tabernacle motive is adopted both in Sta. Chiara and in S. Giovanni, but the monumentality of the tomb of King Ladislaus is quite exceptional. It cannot quite be said that the purest of taste is displayed in it, but it is at least a work that cannot be overlooked in such a study as this.

The study of these tombs serves to throw light on the art history of Naples, the accepted historian in this line being, down to our own time, a certain De Domenici, a guide than whom none could be worse. He has invented artists of whom documents and inscriptions make no mention, and among them a certain Masuccio II, or junior, to whom he ascribes the tomb of the Duke of Calabria, Carlo the Illustrious, a tomb that is really the work of the Sienese artist Tino di Camaino. To this same fantastic Masuccio is ascribed the tomb of Marie de Valois, Carlo's wife, a tomb of which the feeling is not far behind the earlier tomb executed between 1332 and 1333; there is the same Gothic tabernacle, the same sarcophagus with angels drawing back the curtains that we find in Carlo's tomb, a motive that, curiously enough, we shall find repeated in Renaissance tombs. I am sorry I cannot spend as much time as I would like amongst the tombs in Sta. Chiara. I must be satisfied to direct attention to the church, for we have here a veritable museum of fourteenth century art. Side by side with artists such as Tino di Camaino are found masters practically unknown, a certain Pacio and a Florentine, Giovanni; also Antonio Baboccio de Piperno (1357-1435), a sufficiently prolific worker whose preferences do not materially diminish the Tuscan feeling that rules in these tombs in Sta. Chiara.

As to the tomb of King Ladislaus in S. Giovanni, it is attributed to Andrea Ciccione, another enigmatic personage, who had nothing at all to do with this monumental tomb, for it is really the work of a Florentine sculptor, Andrea di Nofri di Romolo (1388-1459). The transitional tendency is to be noted here in the combination of the Classic entablature with Gothic details, and yet the work is vital although somewhat surcharged with figures and other details which give it a feverish vivaciousness.

(*To be continued.*)

ALFREDO MELANI.

[1]See "American Architect" for March 16, 1907.

Hydrogen and the Corrosion of Iron

AT the recent meeting of the American Society for Testing Materials, Dr. Allerton S. Cushman, of the United States Department of Agriculture, made the first public announcement of the very interesting investigations he has been carrying on for several years on the causes which underlie the corrosion of iron. A number of new points were brought out, among which the most startling are that oxygen plays only a secondary rôle in the rusting of iron, and that the best preventatives of rust are to be found among the most effective oxidizing agents known, such as chromic acid and its salts. This view is so contrary to all previous conceptions, says the *Engineering Record*, that it is naturally received with some incredulity when first heard, yet those who are familiar with the investigations and conceptions upon which the new theory of corrosion is based are of the opinion that the evidence which has been brought forward is not only convincing, but conclusive.

The fact that chromic acid and its salts act as inhibitors of rusting has been known for some time, but no explanation of the curious phenomenon has ever been offered heretofore, nor has its application to practice ever been suggested. Dr. Cushman has made a special study of this problem, and although it remains to be seen what practical benefit may develop out of these new ideas, it is most gratifying to be able to state that if any patents are granted covering rust inhibitors they will be taken out in accordance with the practice of the Department of Agriculture so that they will be free for all American citizens.

If a text-book is consulted for an explanation of the rusting of iron it will be found that carbonic acid has heretofore been generally held responsible for the formation of rust. Iron is supposed to be attacked by carbonic acid, with the formation of carbonate, which is then acted on by water and the oxygen of the air to form the red hydroxide known as rust, the carbonic acid being again set free to take up its destructive work. According to this theory, in an atmosphere which did not, like that of this earth, contain about 4-100 of 1 per cent. of carbonic acid, the rusting of iron would be an unknown phenomenon. That this, as well as the peroxide hypothesis which has lately been developed in England, must be relegated to the dump pile of abandoned theories seems to be conclusively shown by these latest researches.

According to the electro-chemical or electrolytic theory which Dr. Cushman upholds, the first attack on iron is not made by oxygen, even in the presence of water, but by hydrogen in the form of the hydrogen ion. According to the modern theory of solutions, many substances when dissolved in water are dissociated into ions, which may be regarded as atoms carrying static electrical charges. Water itself, even when pure, contains a certain proportion of hydrogen ions, and the presence of many impurities, especially those which are by nature acid, increases the hydrogen ions and thus the tendency to attack iron and carry on corrosion. The action is entirely electrolytic, being continually accompanied by an exchange of the electro-static relations between the iron and the attacking hydrogen. Such oxidizing agents as the chromate and bichromate of potash inhibit rusting by polarizing the iron to the condition of an oxygen electrode, thus preventing the approach or attack of the hydrogen ion. One of the most extraordinary points brought out is that this polarization effect is to some extent lasting. That is to say, if iron is immersed or "pickled" in a concentrated solution of bichromate acid and is then washed and wiped, it is rendered passive, so that it resists electro-chemical attack whether this take the form of rust formation or the well-known plating out of copper which takes place if the chromated specimen is immersed in a dilute solution of copper sulphate. In short, the action which goes on when iron rusts is in every respect analogous to that which takes place when iron is immersed in a solution of copper salt. In the latter case, copper ions carrying positive electro-static charges are present, iron passes into solution and assumes the electro-static charge, while copper plates out and becomes visible. When iron rusts, iron passes into solution while hydrogen "plates out." Once in solution the oxygen of the air oxidizes the iron to the insoluble form of the red hydroxide known as rust. This electrolytic action can be shown taking place by the use of a special solar indicator which has been called "ferroxyl." It follows from this that anything that will inhibit electrolytic action will act the part of a rust preventive.

To what extent the various salts of chromic acid will come into use for the treatment of boiler feed waters and for "pickling" structural materials will depend upon experiments carried out on a large scale. Dr. Cushman himself is emphatic in pointing out the necessity for care and conservativeness in approaching the practical application of these purely scientific investigations. One of the modern problems in boiler practice is the rapid corrosion of boiler tubes used in connection with turbine engines. The copper which is dissolved by the action of the steam jets impinging on the bronze blades of the turbine rapidly corrodes the iron in the boilers by the electrolytic action just described. Since it has been found that the presence of bichromates in feed water will prevent this action, it seems as though the solution of this important problem has been discovered. The engineering world will eagerly await the detailed publication of Dr. Cushman's researches, as well as the results of the practical tests which are sure to follow.

Foundations

AN informal discussion was had at the Annual Convention of the American Society of Civil Engineers, July 10, 1907, on the following subjects:

"(*a*) What is the best system of construction for foundations of heavy structures on ground such as that of the City of Mexico, which is an alluvial deposit about 300 feet in depth, and similar in character to that at New Orleans?

"(*b*) Will iron or steel used in foundations, independently or in combination with other materials, last indefinitely when in direct or indirect contact with water?

"(*c*) Will the strength and durability of concrete in foundations be affected if before setting there is: (1) an excess of water; (2) lack of compression; (3) too rapid desiccation?"

JOHN F. O'ROURKE, M. Am. Soc. C. E.—In the three questions submitted in connection with "Foundations," the first calls for the design of systems of construction applicable to the foundation of heavy structural work in the City of Mexico, the ground being an alluvial deposit, about 300 feet in depth, similar in character to that at New Orleans, and taking into account the supporting power of the more or less unreliable material upon which the structure must be carried; while the other questions relate to the durability or strength of the materials in the foundation structure itself, and the manner in which they are placed, without reference to the character of the material upon which the structure is carried.

In regard to the first question, assuming that the material is as stated, namely, alluvial deposit having no very great bearing ability, one can approach it from a more general point of view than the question itself suggests. Every railroad engineer has had more or less to do with the carrying of structures or embankments upon swamps and other soft ground, and the ways by which this has been accomplished successfully are so numerous, and oftentimes so simple and well known, that its solution, with regard to carrying heavy structures in the City of Mexico, involves but another form of a very old problem.

It must be borne in mind that soft ground possesses varying powers of resistance to pressure, dependent very largely upon the degree with which it is confined. There are two ways in which the best results are obtained. One is to place the foundations at such a depth below the surface that the surrounding superimposed weight of the material itself prevents the ground from rising; and the other is by the use of one or another form of column to transfer the weight, through the friction on its sides, to the underlying material; enough surface to be brought into such contact to distribute the weight and reduce the stress to that which the material can bear without further movement.

It is not necessary to go into lengthy discussion of either system, since both are well known. The writer has built culverts, and even heavy bridge piers and abutments, upon material into which a man would sink if he attempted to stand upon it, by simply distributing the weight over an area which acted as a

whole, because the structure was sufficiently strong to act as a unit in applying the pressure. No formula or rule seems to be applicable by which this area can be fixed, nor can the united resistance which soft ground offers under such conditions be always accounted for, but it is known by experience that material little different from mud will sustain pressure up to 1 ton per square foot after the initial settlement has taken place, when the area involved is considerable and the loading has been uniformly applied over the whole surface. The same is true of the column system, of which the most familiar example is the ordinary wooden pile. It is a common experience in building trestles across swamps and marshes, to find that a pile which can hardly sustain its own weight when driving has ceased, will, in a few days, take such a "set" that several heavy blows of the pile-driver hammer are necessary to start it again, and when started it will drive about as easily as before, until the harder material is reached; the fact being, however, that, given a reasonable penetration in the soft material, the subsequent stability of the pile is not increased very much by its support upon solid bottom. The writer calls to mind, in particular, the case of the foundation piles in the falsework of the Poughkeepsie Bridge, where piles were driven 100 feet below the surface of the water into 60 feet of silt and were loaded with from 10 to 20 tons each during the erection of the fixed span, and in which no settlement was noticed during the erection of that span. When the first fixed span was completed, the falsework was taken down, and the piles were pulled out and used again in the erection of the second fixed span, the interesting fact developing that a dozen heavy blows of a 6,000-pound hammer were necessary before a pile could be started, after which it drove easily and was then readily pulled out.

It is clear that either of these methods may be used in providing heavy foundations in the City of Mexico, provided nothing in the ground itself would cause the decay of the material used. It is the writer's experience that wood, driven or placed in clay, is as completely preserved as though immersed in water, and, time and again in the construction of foundations in the lower part of New York City, he has removed timber—mud-sills and stringers—which had been placed above the water level, but in clay, more than 100 years before, and has always found them in good preservation, where such conditions existed.

As the question of materials enters largely into the choice of the system to be used, if suitable wooden piles are not available, concrete or steel could be used, the choice resting on economic rather than engineering considerations. This is true of the "distributed pressure" system, also, using the three materials separately, or in combination, as may be found most economical or substantial for each case.

Iron and steel used in foundations, apart from conditions where electrolysis may occur, last indefinitely when in direct or indirect contact with water, provided the water remains unchanged. The reason for this is obvious. Water attacks iron or steel on account of the oxygen it contains, and, if this is a proportionately small quantity, the amount of oxygen contained in wet concrete or ground is negligible, and, having once been exhausted, the metal remains unharmed and protected.

The writer has seen many cases where immersion in standing water has been a matter of years, and in every case the effect upon the metal has been no greater that if it had stood for the same length of time in linseed oil. In one case bolts on the inside of cast-iron cylinders, filled with concrete, were exposed to the salt water in the Harlem river for more than 30 years, and when removed were found to be without rust. In another case a pipe was immersed for ten years in an artesian-well, the water in which had not been pumped for 10 or 15 years, and no corrosion of this inside pipe had taken place, the scale was still as fresh as when the pipe was new, and the tool marks of the pipe-coupling apparatus were still perfectly fresh.

Similar results came under the writer's observation in reference to the condition of rods and nails found in wooden foundations where the surrounding material was impervious to air, and in one case which came under his observation, at the time of the removal of the old elevated-railway columns in Greenwich Street, New York City, prior to making way for the new structure in 1878, the bottom part of these columns and the bolts in the masonry were found intact, the corrosion gradually increasing until near the surface, where the material was almost entirely destroyed by rust. This experience with both wood and iron, where the renewal of the oxygen in the surrounding water was prevented, has been uniformly that of finding the material perfectly preserved, so that, in the writer's practice, he does not hesitate to advise the use of either material under conditions where a fresh supply of oxygen is excluded. The casing of concrete, in his belief, is an absolute protection against any oxygen penetrating from the surrounding water, and the uniform practice in foundation work in New York City, where both materials are used in combination, is to pay no attention to water-proofing as a preservative, but depend on the concrete to preserve the iron, which it does in the manner stated. There are exceptions to this, of course, but, generally speaking, where the water-proofing is not underneath the steel, it is for reasons connected with the water-proofing itself, more than from any intention to protect the steel in that way. As a matter of fact, water in one form or another is always a possibility, but conditions can be insured which will prevent its being changed, which is the great desideratum.

In answering the third question, it is the writer's belief that concrete should always be made so wet that it will not permit of ramming, but that, after the concrete has been put in place, a certain amount of spading or "packing back," in the case of the form, so as to give a smooth finish, is all that is necessary in order to produce the most compact and durable concrete. As to rapid desiccation, there is no doubt that if concrete is dried out, or has not had sufficient water to permit the chemical action or "set" being a finished chemical action, the concrete will be poor, or even worthless. It is not likely to occur, however, under most conditions, even where fresh concrete is allowed to set in the sun, but it has come under the writer's observation many times, in placing concrete under compressed air, that the air which escapes through the concrete in passing out of the air-chamber of a caisson, is most likely to create veins through the concrete from which the water evaporates before the concrete has had an opportunity to set, leaving that part of the concrete in a condition which is changed very little from that of the dry materials before the concrete was mixed.

In specifications, the writer would advise the entire elimination of the requirement for ramming in beds, and that the concrete should have sufficient water to enable it to puddle itself, with such handling and manipulation as are always incidental to placing it, the only exception being arch-work and form-work, where ramming may be necessary in order to drive the concrete into places which otherwise it might not fill properly—the ramming in this case being for the purpose of filling the mould, not for compacting the material. As to conditions where the rapid desiccation might threaten it, this should be provided against wherever possible. There is no doubt that wherever this occurs the quality of the concrete is injured and sometimes destroyed.

Present Status of Explorations in Greece

IN a recent issue of the Boston *Transcript*, Mr. Arthur Stoddard Cooley, Ph.D., gave the following interesting *résumé* of the operations of the various archæological exploration-undertakings in Greece, which, as it is for architects quite as useful as a longer and more particularized account, we reproduce at length:

The question so often asked by visitors to the excavations among the ruins of Greece and Italy, how the ancient sites ever came to be buried so deeply, has received one striking answer during the past year at our own excavations at Corinth, as well as at Olympia. As is true in other parts of Europe, the past winter has been unusually severe in Greece, causing great suffering and even loss of life and damage to the land, especially from floods and rain. Even in the early autumn there were very heavy and long-continued rains, and at Corinth our excavation was flooded and much soil washed in from the surrounding fields, so that when the water subsided a deep stratum of mud and débris was left, in some places burying the marble pavements and ancient foundations to a depth of several feet. The famous underground fountain house in the market-place was filled up entirely.

The Greek Department of Education, under whose charge are the ancient remains, cleared away much of the débris, and most of what they may have left will probably be removed during our own excavation campaign, under Director Hill, which should now be in progress. The Greek Government also made some excava-

tions, in the course of which among other finds was a fine head of an ephebos. They set up some of the prostrate columns of the ancient Temple of Apollo on the hill, discovered by us in 1899, replaced and strengthened the broken architrave block between two of the standing columns on the south side of the temple, and, removing part of the unfinished Kapodistria school-house, which covered the east end of its foundations, they devoted the rest of the building to a museum, to replace the small and inadequate one just west of Plane Tree Square.

A similar occurrence took place at Olympia in January. The little river Kladeos, swollen by rains, overflowed its banks and buried again, somewhat as it did centuries ago, part of the ruins nearby excavated by the Germans in the seventies. But this time the stream excavated a little, and in the ancient gymnasium brought to light helmets and other objects. Fortunately no damage was done to the excavated portion of the gymnasium. The red wooden bridge across the river was carried away. According to the plans of the State Engineer of Elis, approved by the Minister of Education, the bridge will be rebuilt about 500 feet farther up the stream, and a new road will be constructed, starting from the railroad company's hotel and passing some 160 feet north of the Altis. This new road will fill a long-felt want, connecting the district of Gortynia with Pyrgos, and will obviate the passing of travellers through the excavations themselves by transferring the route to the other side of Kronion Hill. Measures will also be taken to keep the Kladeos in its bed and prevent further inundations of the ruins.

Dr. Kabbadias, Ephor-General of Antiquities, and Architect Balanos, who has been in charge of the restoration of the Erechtheum, also recently visited Delphi to take measures for necessary repairs to the museum there and for the care of the outside antiquities, which have suffered considerable damage from the winter rains.

Among the archæological activities of the Greek Government projected for the coming year is the erection of museums at Larissa, Volo, Tyrnavo and Halmyros in Thessaly, and at Tegea. The sites will be provided by the towns, and Larissa has already given a large plat and appropriated money for the removal of the barracks occupying it. Land at Eleusis and the Bœotian Orchomenos has been expropriated for excavation. The Archæological Society will devote their surplus of some 170,000 drachmas from last year to the beautifying of the different ancient monuments of Athens. During the past year the Society carried on excavations in the sanctuary of Amphiaraos, near Oropos, at Sounion, in Eubœa, Thessaly, Lokris and Naxos, and at Thermos in Ætolia, Lykosoura in Arcadia, Epidauros and Corinth. Besides the work referred to above, at the last place the remains of the Fountain of Peirene were strengthened. The re-erection of the Temple of Apollo, near Phigaleia, with the old material which has been to so large an extent preserved, has continued, and the Society has tra, near Sparta, where the old church of St. John has already been repaired. Museums have been built or enlarged at Lykosoura, undertaken the preservation of the Byzantine monuments at Mis-Sparta and Corfu.

The French School at Athens is devoting its attention, as is well known, to Delos. At the first public meeting of the year at the school, attended by the king, the crown prince and other royalty and the archæologists of the various schools, reports of the work there were given by the director, M. Holleaux, and M. Leroux, one of the fellows of the school. Among the more interesting discoveries at Delos are the stoa of the Macedonian King Antigonos II., the double stoa named after Philip, a curious circular monument raised in honor of some prince, and especially a truly magnificent house with a peristyle whose columns still stand upright, a paved vestibule and statues of the owner and his wife. This house seems to belong to the second century B. C. Fragments of a fresco discovered depict the myth of Ariadne, and among sculptural finds is a head of Bacchus of the Hellenistic period.

M. Leroux spoke especially of the marble lions found at Delos, works of the Naxian School, and adduced evidence that one of the four lions adorning the entrance of the arsenal at Venice had been carried away from Delos. The provenance of the other three was known, they having been brought from Peiraieus.

At one of the open meetings of the German Archæological Institute at Athens after a commemorative address by Professor Heberdey, director of the Austrian Institute, on the recently deceased archæologist Benndorf, Dr. Doerpfeld spoke of his work at Leukas, the results of which have been chronicled in the *Transcript*, but erroneously referred to the island now called Ithaca. He reminded his hearers that his excavations were not for the purpose of proving Leukas to be the Homeric Ithaca, for this he feels depends on geographical and historical arguments, which both in print and in speech he has often minutely and to many convincingly set forth. Among the most recent converts to his theory is the eminent geologist Philipson, convinced by geographical reasons on the suppositions that Homer described facts and places as they were and not creations of fancy, and that the change of the name of Ithaca to Leukas and the transfer of the name to the island so-called to-day are the result of an emigration. These suppositions Doerpfeld considers as unquestionable, for Homer's accuracy has been proved by the excavations at Troy and Mycenæ and in Crete, and we know from history that the Dorian migration brought about transfers of peoples and changes of names of places. Doerpfeld's excavations have been carried on in Leukas in the plain of Nydri, where he locates the city of Odysseus, and at other points, especially at the so-called Swine's Cave. The finds belong to prehistoric times and some large walls, which he regards as most probably remains of the city and palace of Odysseus.

An important work in this connection has just been published, "Maps of Leukas, Contributions to the Leukas-Ithaca Question," by a German, Walther von Marees, sent to Greece for the purpose by the German emperor. To quote from the New York *Atlantis*, to which I owe this information, as well as most of the matter of the present article: "Six maps accompany the text, in which is made every geological and geographical explanation and also all information useful to specialists is given regarding the manner in which the work was completed. The first map, on a scale of one to 100,000, refers to Leukas and the surrounding regions. Four other maps, on a scale of one to 25,000, relate to the channel between Leukas and the mainland and the Homeric localities in the island, according to the clear description of the poet in the Odyssey. The sixth map gives collectively all the places mentioned in the Odyssey. From the geological and geographical standpoint the question is completely settled by these maps in agreement with what not only Doerpfeld has previously maintained, but other geographers have recognized as correct," and the question must now be discussed from a philological or archæological point of view.

Doerpfeld's excavations at Leukas are confined to the summer. In March he began further work at Tiryns, where many ancient objects have been unearthed already and where he expects to find a still older megaron than that revealed twenty-two years ago by Schliemann and himself. He is continuing his investigations also at Olympia, where finds have just been reported on the northeast side of the Pelopion consisting of clay and bronze figurines of the geometric period and a small bronze mule and figures of other animals.

The British School at Athens, under the direction of Mr. Dawkins, assisted by Messrs. Dickens, Wace and others, is now prosecuting its excavations at Sparta with gratifying success and numerous small finds on the site of the Temple of Artemis Orthia by the Eurotas discovered last year and in other spots. Word has just been received of the discovery of the famous Temple of Athena Chalkioikos (of the Bronze House), of great archæological and also historical interest. Here the general Pausanias took refuge from the Spartans, was walled in and left to starve to death. Among the finds are three inscribed marble slabs, with the image of a sickle, one of which mentions the name of a victor in three contests; gold dust, a tiny double axe of gold, the symbol of the Cretan Zeus; a Corinthian vase, a headless archaic statuette, and many very small cases of different forms associated with heroes, of the sixth century B. C., and eleven gold coins of the shape, size and weight of a 20-franc piece. The direction of the south side of the late enclosing wall of Sparta has been determined, and the discovery of the location of Pitane, the largest of the villages composing the ancient city, is hoped for.

Meanwhile the Greeks are making notable finds in Thessaly. The Ephor Arvanitopoulos discovered by a mound near the railroad station of Velestino a quadrangular building composed wholly of beautiful white marble, and of the best workmanship. Since this is but a few paces distant from the artificial funeral mound, the Ephor believes we have here a magnificent tomb with portico, outer chamber and propylaia, like those discovered a half century ago among the royal tombs of Pydna and Pella in Macedonia, which belonged to the fourth century B. C. Judging by the architecture and by fragments of vases found in the

excavation, the Ephor dates this building between 420 and 450 before Christ. "It will be an event of great historic significance if under this funeral mound the spade of the workmen shall discover the graves of the kings of Pheræ, and particularly of Jason, the great ruler of Thessaly, so pitiably assassinated, who had conceived the daring and enterprising plan carried out later by the great Macedonian conqueror."

The proposed erection of a museum at Volo, the seaport of Thessaly, has been referred to above. A rich collection of inscriptions, coins and other objects found in excavations in northern Greece is now in temporary quarters, and there are promises of many gifts from private citizens as soon as the museum is done.

Excavations have been begun on the site of the ancient market-place of Athens, just east of and below the hill where stands the "Theseion." A number of the houses here have been expropriated and will be removed. Near the Dipylon gate the old Church of the Holy Trinity (Hagia Trias) is to be removed and rebuilt elsewhere and further excavations will be made here at the beginning of the old Sacred Way to Eleusis.

The discovery of the Palace of Kadmos at Thebes in excavations by the Greek Archæological Society is reported.

ILLUSTRATIONS

HOUSE OF FRANK E. RUTAN, ESQ., SEWICKLEY, PA. MESSRS. RUTAN & RUSSELL, ARCHITECTS, PITTSBURGH, PA.: TWO PLATES.

ITALIAN TOMBS: THREE PLATES.

For descriptions, see article elsewhere in this issue.

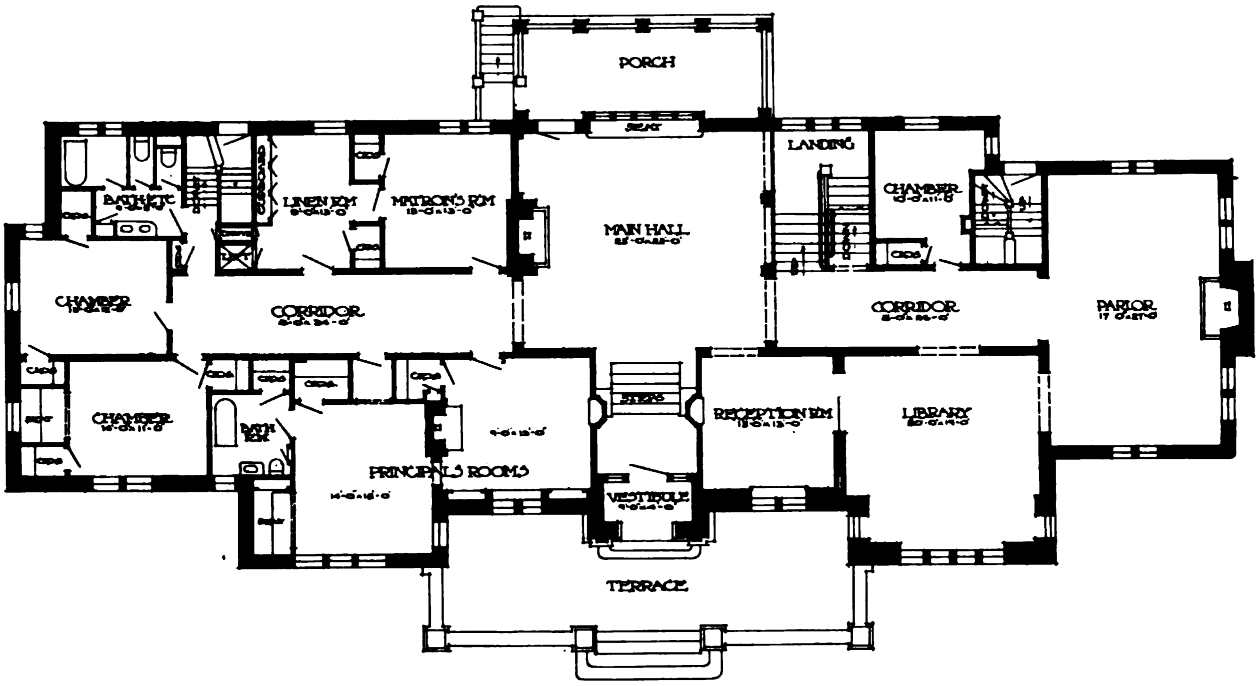
HOUSE OF MRS. COTTON, 44 AMORY STREET, BROOKLINE, MASS. MR. W. G. RANTOUL, ARCHITECT, BOSTON, MASS.

THE GRACE NEWBERRY NURSES' HOME, DETROIT, MICH. MR. ALBERT KAHN, ARCHITECT, DETROIT, MICH.

HOUSE OF MRS. DOWNER, 68 AMORY STREET, BROOKLINE, MASS. MR. ROBERT COIT, ARCHITECT, BOSTON, MASS.

HOUSE OF MRS. KASSENBURG, BROOKLINE, MASS. MR. H. E. DAVIDSON, ARCHITECT, BOSTON, MASS.

HOUSE OF G. A. GRAY, ESQ., MITCHELL AVE., CINCINNATI, O. MESSRS. ELZNER & ANDERSON, ARCHITECTS, CINCINNATI, O.



FIRST FLOOR PLAN: GRACE NEWBERRY NURSES' HOME, DETROIT, MICH. ALBERT KAHN, ARCHITECT.

NOTES AND CLIPPINGS

A Large Teak Log.—The largest teak log ever sent by rail, though not the largest received in Burma, was recently extracted from the Pyinmana forest by Messrs. Steel Brothers & Company. It was 53 feet in length and 12 1-2 feet in girth. There are still large teak trees in the forest, but in most inaccessible spots, miles away from navigable creeks. Mast pieces in olden days 80 feet long were often seen in Moulmein. These are no longer wanted, as iron or steel work has long taken the place of wood.—*Indian Engineering.*

Terminology in Decorative Art.—At the British Association, Professor Myres introduced a new subject in the Anthropological Section, under the title, "A Terminology of Decorative Art." The importance of this is perhaps more evident in connection with anthropological than artistic study. It amounts to this—that the special forms of decoration used by uncivilized and prehistoric peoples have a great deal of significance in regard to racial extraction and relation; and that while it is easy to give names to those decorations which are at all pictorial in character, there are no accepted names for the considerable number of combinations of lines in purely geometric ornament; and Professor Myres urged (and we quite agree with him) that a recognized and scientifically based terminology for distinguishing these classes of ornament is desirable. It should take account of the nature of the process employed by the artist, as well as the result; since some forms of ornament which differ very little in ultimate appearance differ very much in their method and principle of construction. The vocabulary, he suggests, would be made up partly by the coinage of words, as in geology, from Greek or other universal vocabularies; but he thought much might be done to fixe current idiom by detailed descriptive analysis of some of the commoner geometrical forms, such as the triangle, the wavy line, the spiral, or the plait. Although these suggestions have been made with special reference to historic study, they are not without interest in conectinon with art, where an analytical vocabulary of forms of abstract ornament seems certainly to be rather wanted. We have names (rather empirical) for certain ornaments—the "key-pattern," "bead-and-reel," "egg-and-tongue," etc.; but these are not very scientific in their character, and there are a good many minor varieties of geometrically derived ornament for which there is no recognized name.—*The Builder.*

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SOME people may feel that the reporters' ears betrayed their hands, while other some may conceive merely that the President of the New York Board of Fire Underwriters, Mr. George W. Babb, is a very imaginative and somewhat hysterical person, because of the remarks he is reported to have made at a recent meeting of the New York Building Code Commission, the session being assigned to the consideration of the limitation of the areas of buildings—vertically as well as horizontally. But we believe he spoke as reported, soberly and truthfully, when he declared that underwriters were living in dread of a conflagration in the skyscrapers in the congested district of lower New York City, where the streets have only a hand's-breadth width as compared with the lofty walls that rise on either side. The conflagration to be dreaded, the one that is dreaded, is one occurring in the upper stories of these lofty buildings far above the reach of the present, or any probable future, fire-extinguishing apparatus; and if such a high-level conflagration should get started it would prove more disastrous than any event of the nature that has ever occurred. The unthinking, however, will at once rejoin with the assertion that, as the skyscrapers are essentially or actually fireproof, such a fire is not only an improbability but an impossibility. But as we sit here we see in this room a bulk of inflammable material that in full combustion could radiate enough heat through the windows to bring into peril the contents of a room facing it across so narrow a passage as, say, Nassau Street. Besides, there is one risk that is generally overlooked. No one really knows what is going on in each one of the rooms of these altitudinous hives of human industry or what the contents and the bulk thereof really are, so it is rarely remembered that a bad fire occurring in a single room may produce there not only heat but a shattering explosion of some kind, which, destroying the integrity of the fireproofing, would cause a rapid spread of the flames and an increase of the area in combustion.

UNDERWRITERS are not alarmists. They don't object to fires, as they know that their business depends on other persons' dread of fire; but they do not want conflagrations, and we believe that Mr. Babb was quite justified in giving utterance to his warning, all the more that he made it the excuse for presenting a distinct recommendation, with which we are, and very many people will be, in accord, if every owner of real estate is to be allowed the privilege of doing what he will with, and upon, his own. Mr. Babb urges that the height-limit and area for combustible buildings shall be set at 55 feet and 5,000 square feet respectively, while for the actually fireproof building they shall be increased only to 125 feet and 30,000 square feet. Statistics will show that a conflagration occurring in buildings so limited will give the largest and most efficient fire-department all the work it cares to attempt, with not too-certain a chance that the battle will go in its favor.

AT this point, as there seemed a possibility that the limitations suggested might put a check on the business of architects as now conducted, Mr. John M. Carrère, who was present at the meeting, asked that whatever limitations might be decided on should be as broad and liberal as possible, and expressed the belief that every block should be built up in pyramidal fashion. This we take to be essentially the same recommendation we have often made, for the most obvious solution of the skyscraper problem is that sites for such buildings should be confined to a limited area in the middle of each block. Mr. Carrère expressed the further belief that the erection of skyscrapers would be checked by the burden of taxation, but that, as the natural burden under the uneven application of existing laws and practices was evidently insufficient to the desired end, this burden should be increased by requiring the skyscraper to pay taxes in proportion to its height and area. The suggestion is perfectly logical. While each citizen has a right to equal protection for life and property at the hands of the established protecting forces of the community, no man has a right to use those resources selfishly and in a way that his fellows cannot. If in a community where ten-story buildings are the rule a few men choose to put up thirty-story buildings, it is illogical that they should expect the common resources of the community should be used in protecting their extra stories—at an increased public cost and a vastly greater hazard—unless they pay more in the way of taxes than their more lowly-minded neighbors

pay, and the increase of their contribution on the basis of valuation is not enough to achieve the end the speaker had in view.

IT is distinctly an English custom for a professional man to sell his business and good-will in time of need, quite as if he were disposing of any other merchantable article, and, in spite of the fact that the contract between architect and client is a personal one, architectural connections in England are sometimes disposed of in this way. In this country such barter and exchange is almost wholly restricted to the sale of a medical practice—though how the contract between architect and client can be more personal than that between physician and patient, it is not easy to see—but there is, so far as we know, nothing that prevents the buying and selling of an architectural practice and good-will, if anyone chooses to indulge in such merchandizing. But, if any architect should be tempted to sell his business and good-will, it may be of value to him to know how the Massachusetts Supreme Court has just ruled in an analogous case. In the case of a dentist who sold out, to his former partner, his interest and good-will in the business, the Court holds that such sale implied an agreement not to re-enter practice near enough to the old stand to impair the business there. Ignorant, seemingly, of this implication, the vendor, after the lapse of three years, resumed his practice in an office only half a mile away from his former partner, who, naturally, sued for an injunction against him, and the full bench has just united in enjoining the vendor from practising his calling anywhere in the city of Boston.

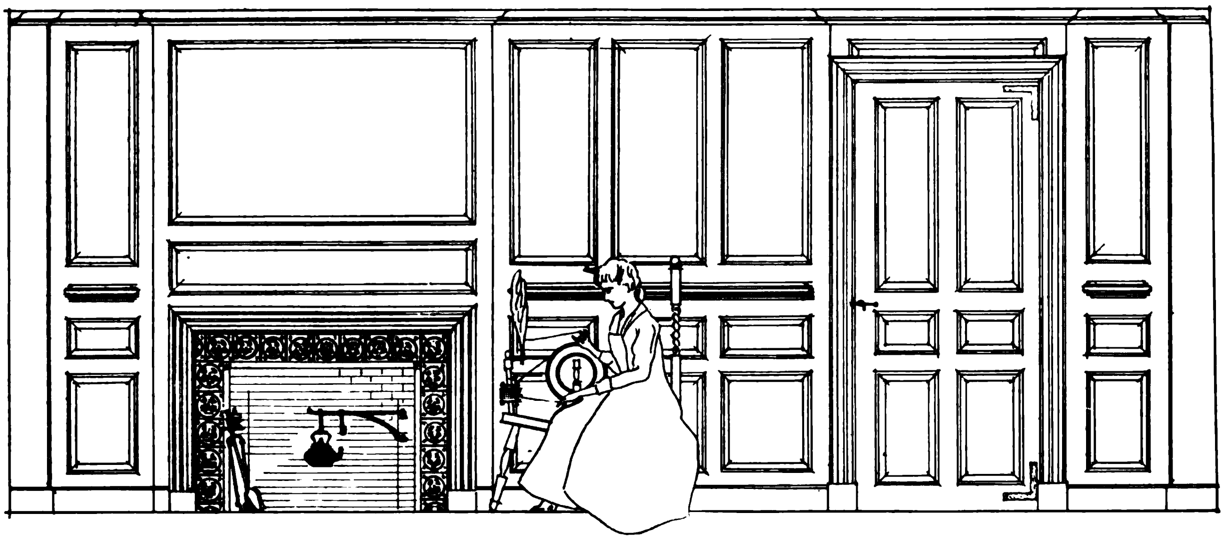
AS to the wisdom of purchasing an architect's practice in this country where clients are less used than they are in England to such transfer of allegiance, the intending purchaser must judge for himself, for, strictly speaking, as the contract between client and architect is purely a personal contract, it is very doubtful whether even in the case of unfinished work, the vendor could sell anything on which the buyer could realize, while so far as the "good-will" of the business goes there is, for the same reason, doubt whether anything of substantial value can be transferred—except in a negative way in small towns —through the vendor's removing himself from the former scene of his labors. As to price, we find an English journal of late date advising against paying, in a favorable case, "more than three or four years' purchase"—because of the risks we point out; that is three or four times the net annual profit of the vendor as established by a careful examination of his books.

WHILE the business man deals in commodities, the professional man deals in advice. Clergymen, doctors, lawyers, engineers and architects deal primarily in advice; the drawings which an architect makes are merely his device for making his advice understandable, just as pills, gargles and lotions are the symbolic expression of a physician's advice. Now, as a physician's or a lawyer's advice is, by common knowledge, a matter or commodity that may be accepted or declined, so far as action is concerned, it should follow that an architect's advice can similarly be adopted or rejected. But no, there is something sacrosanct about an architect's advice; it must not only be paid for as advice, as is that of the lawyer and the doctor, but it must, further, be acted on; at least that is the logical inference to draw from the frequent argumentation that is advanced by architects on certain occasions when they lift up their voices against those promoters of competitions who properly and rightfully, as we hold, reserve to themselves the right of carrying into execution, or neglecting to do so, the advice they receive (and pay for) in the shape of that competitive design to which is awarded first place. If architects would only remember that a set of competition drawings is simply so much advice, which the one to whom it is proffered is free to accept or reject, we believe a good deal of heart-burning and irritation would be avoided.

A NEW use has been found for English cathedrals or, rather, an original reason for their continued preservation has been brought forward. Says the Dean of York Minster, in a report dealing with the restoration of the west front, recently completed by Mr. Bodley: "It will be well, therefore, if for some time to come the condition of the fabric is regarded not only for ecclesiastical and archæological reasons, but as a token to the citizens generally of what is really the prevailing condition of the atmosphere which they are compelled to breathe and in which they live." The Dean shows that during the last hundred years since the west front was previously restored just as ancient buildings built of exactly the same stone but situated outside of York have suffered no degradation through atmospheric causes, and he argues plausibly, with citations from Faraday, Sir Frederick Treves, Sir Oliver Lodge, Sir William Richmond and others, that the cause of the deterioration of the Minster's front is to be found in "the number of smoke-emitting chimneys throughout York," and that smoke-laden air is as injurious to human beings as to stone buildings. But it takes a British ecclesiastic to argue that as a means of determining the hygienic quality of the circumambient atmosphere, the cathedrals of Great Britain must be kept in artistic and architectural repair.

THOSE of us who believe in fair-play must rather relish the stories that now begin to be told of the manner in which Italy is enforcing the new law against the exportation of works of art, although it is rather irritating for the prideful American to have trouble with custom-house officials at both ends of his journey. The New York *Times* relates that a certain American painter, in order to get paintings done with his own brush through the Italian custom-house, had to make oath that they were not works of art, a course that must have pained his pride and possibly his conscience, though both were restored to their normal condition when he found, on reaching this country, that, in order to get them through the custom-house here free of duty, he must make oath that they were works of art, and, further, executed by his own skilled hand.

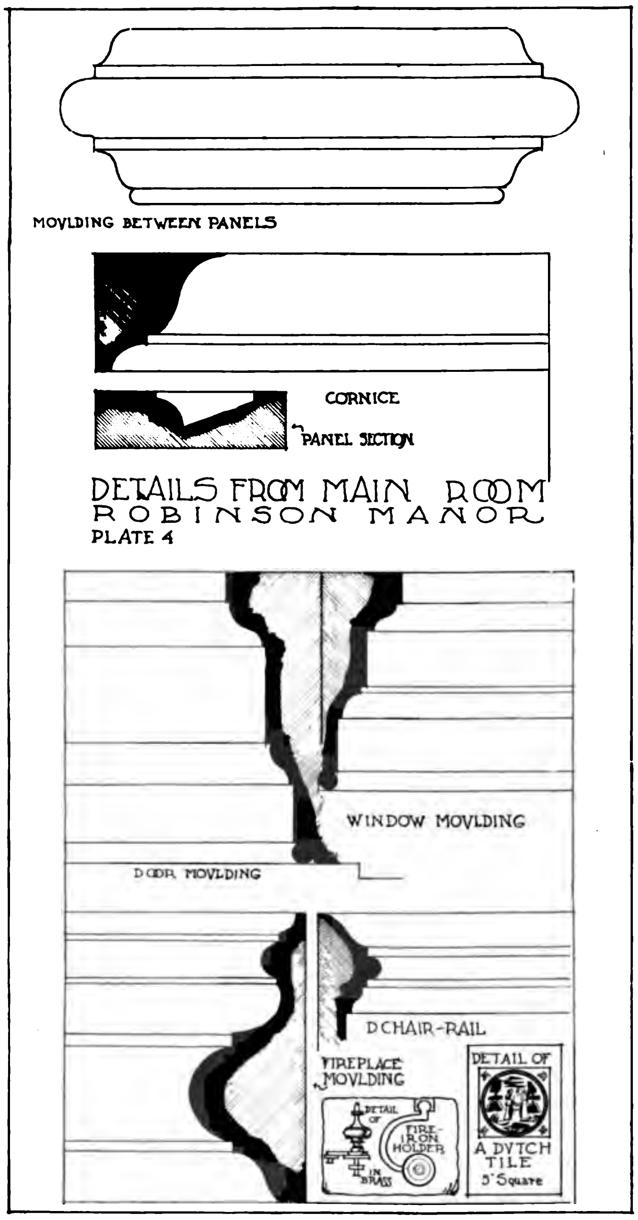
A Narragansett Manor House



IN the southern part of Rhode Island, known as the Narragansett country, are the remains of a class of houses which are as rare in New England as they are common in the Southern States. These houses were manors on great plantations, and were built and maintained on a scale even more like that of a small European feudal establishment than were the Southern manors. Instead of general slave labor, the proprietors of these Narragansett manors had tenants on numerous small farms, and a large staff of negro slaves for personal service. For a consideration which must necessarily be so little antiquarian, perhaps all that need be said historically in this connection is contained in this paragraph from Higginson's "*Part of a Man's Life*":

"Nothing indeed now remains in America which so recalls the feudal system as the whole region of the Narragansett country in Rhode Island, where one still sees the remains of a class of buildings differing in kind from any now erected. They represent great square houses of fifty or a hundred feet front, with drawing-rooms twenty feet square and from fourteen to fifteen feet high. There were two stories, with high gambrel attics for the slaves, who often occupied out-buildings also

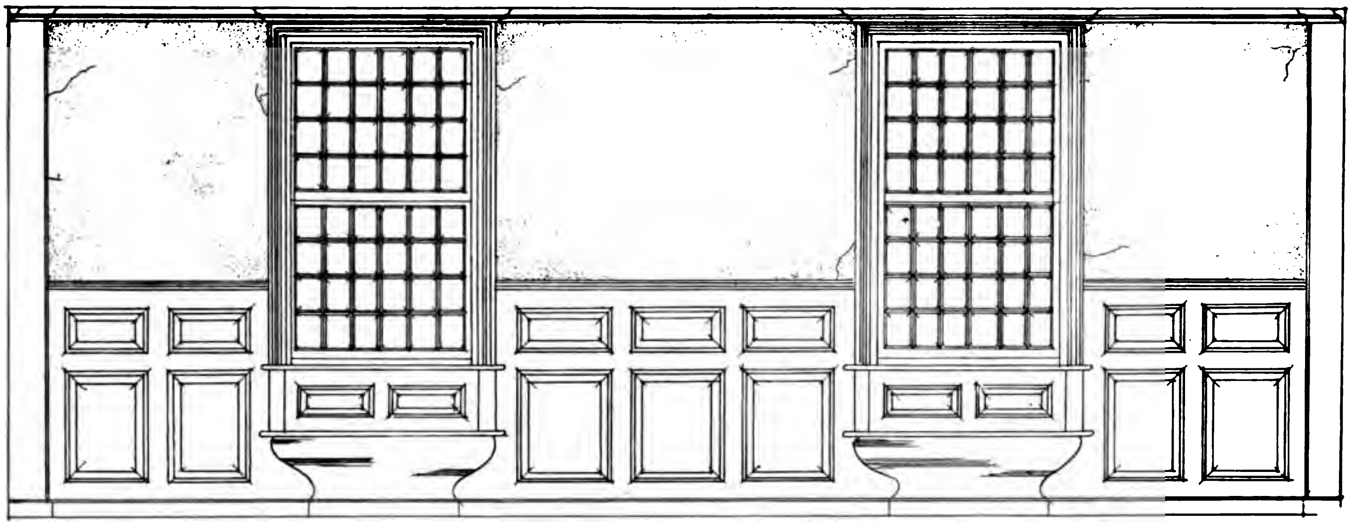
Of this type of early Colonial house, probably the best existing example is the old Robinson manor, which lies little more than a mile north of South Ferry, on the west shore of Narragansett Bay.



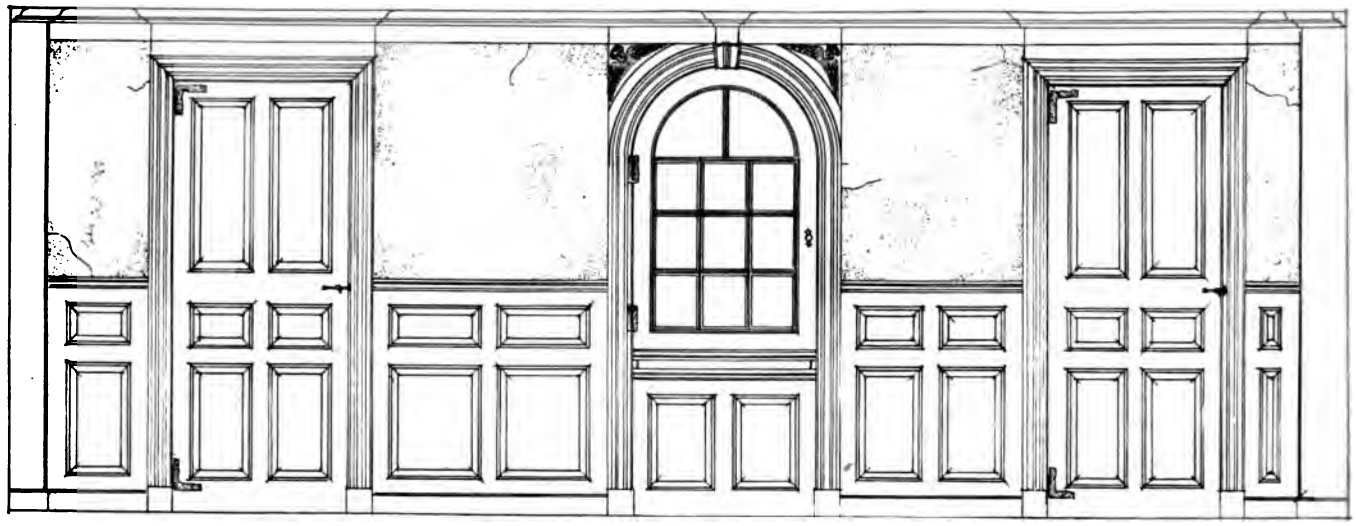
The house, together with the quarters for the slaves, was originally 110 feet long, reduced now to 60, with a depth of 30 feet, the massive stone foundations of the demolished part being still plainly traceable at the east side of the house. In height the building is of two stories, with a tall, wide-angled gambrel roof. The structure, a necessarily crude but very massive growth from primitive conditions, has stood against time and neglect with great strength, and may last another hundred years before it finally decays.

As a general outline of the materials and construction of the Narragansett manors as a whole applies to this particular example, observations gathered from a number of typical houses in that region serve to illustrate the prevailing methods of construction in earliest Colonial architecture, and will describe the Robinson manor as well. The stone used in the foundations was for the most part split from large granite boulders, as well as such stones from the field as were of naturally suitable shapes. This part of Rhode Island being the terminus of a great glacial moraine in the Ice Age, granite boulders of all sizes are to be found in profusion in the fields. These were split with considerable precision into great rectangular blocks, by means of drill-holes and dampened wedges—a means still employed by the farmers. In all the larger houses the foundations were fully mortared, while in some smaller buildings dry walls built with great skill are found. As the walls often rise less than two feet above the ground level, openings in the form of windows are very rare. Upon this foundation wall rests a heavy sill, often eighteen inches square, roughly hewn, with still-visible adze-marks, from the enormous oaks which once grew in Rhode Island. The sills were mortised at the corners, and were either spiked or pegged together. Into these sills the floor-beams were mortised—timbers generally from eight to ten inches square, also roughly hewn. In some houses, even the largest and best (as in Robinson manor), the

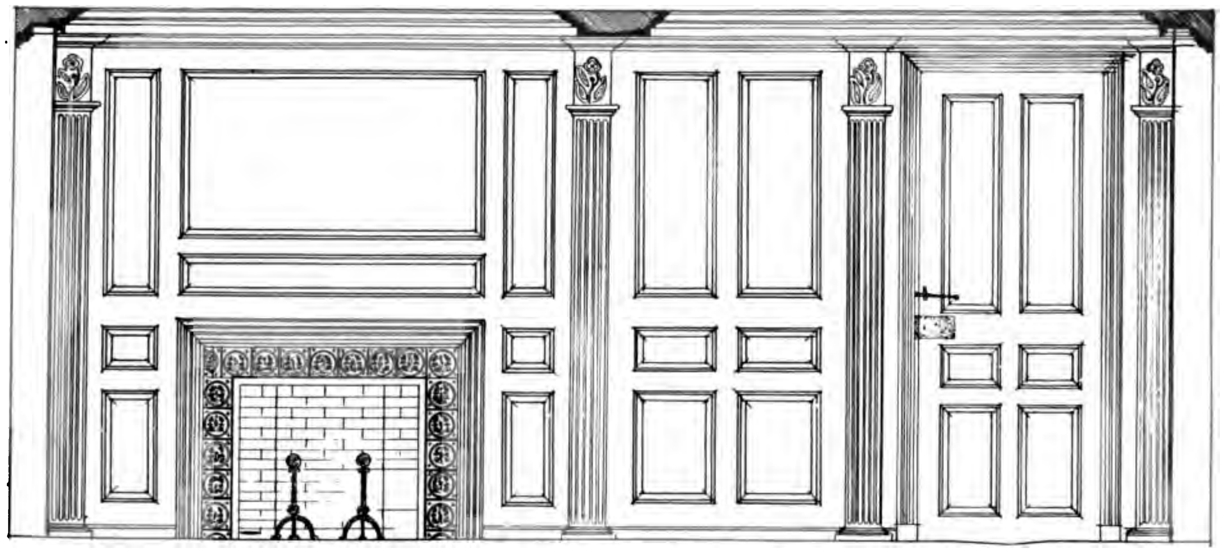
beams beneath the first floor were stout oak logs, of about ten inches diameter, with the bark intact, the upper surface hewn flat and the ends mortised into the sill, which was always squared.



On these beams were spiked the floor boards, which were often two-inch planks of great width, making a whole so solid as to be practically unaffected by any ordinary strain.



The frame of the house was of heavy oak timbers, mortised together and generally fastened by wooden pegs, and in the Robinson manor the corner-posts, even in the interior of the building.



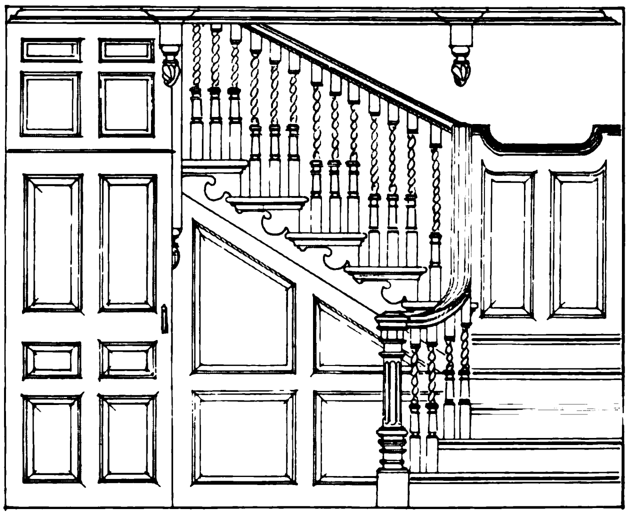
are fourteen inches square, with the upper-story floor-beams mortised into them.

Lighter studding formed the outer walls, sheathed with boards about an inch and a quarter thick, that had width unbelieveable to-day. In the attic of the Robinson manor, it can be observed that the sheathing is of boards cut directly from a single very large log, and used as they came, with rough unparallel sides, and in varying widths.

The roof, consisting of a series of trusses, without rafters or purlins, was usually constructed without a ridge-pole, and seems perfectly capable of resisting a tendency to sag. These trusses were rather closely spaced, the beams very heavy, with deeply mortised and firmly pegged joints, and the whole was held together by the substantial sheathing, capped over the shingles with wooden ridge plates.

The shingles, which were hand-made, were of cedar, and it may be said, indeed, that no mill-work appears in any examples as old as the Robinson manor, and that nearly all the building materials were taken directly from the estates on which they stood. Even the laths were roughly split from scraps of leavings and were of widely varying widths and thicknesses.

A single massive chimney was made to take the flues from all the main rooms, and consequently rose from the center of the house. It was ordinarily built of stone, split in thin pieces to lay in even courses, and the fireplaces were lined with brick. In



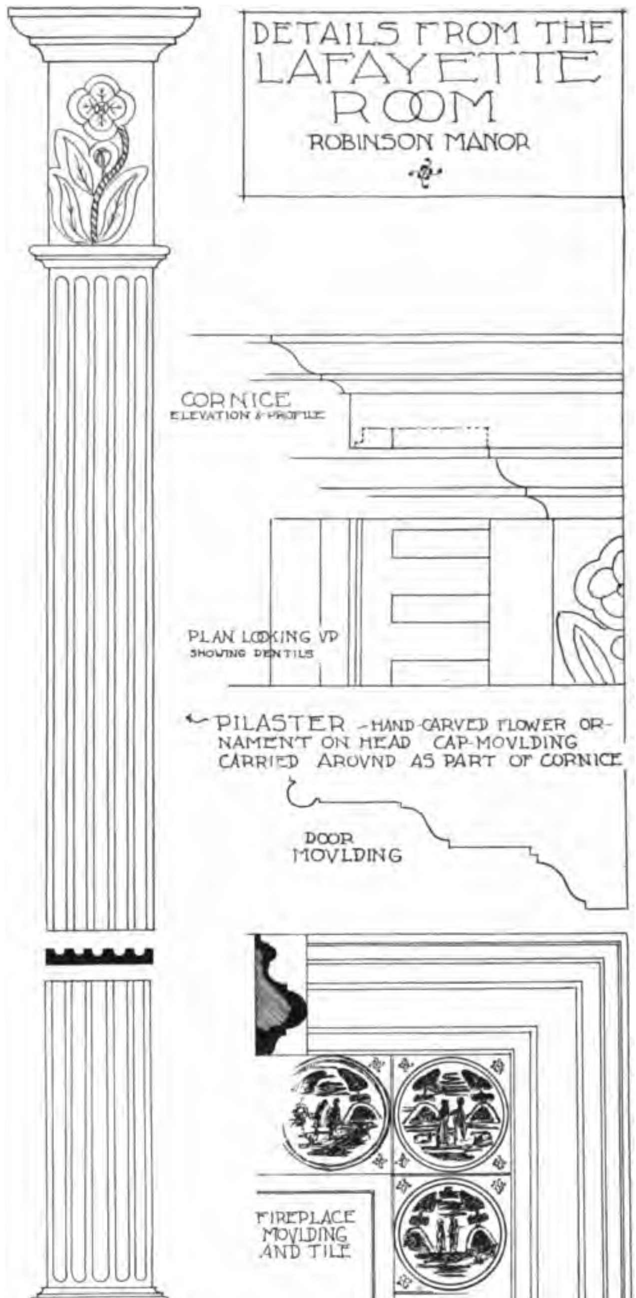
the cellar, at its base, the chimney was often built on a single great brick or stone arch, utilized, in one instance, as a vault. The brick employed for this purpose, as well as for lining the fireplaces, was smaller in every dimension than the modern brick, being hand-made, and in some cases is said to have been brought from Holland. The fireplaces were fitted with heavy stone hearths, resting upon shoulders of the chimney, which consequently diminished in size as it ascended, until it appeared above the roof, mortared smooth, and unelaborated by any ledge or capping.

The interior treatment varied considerably, and fewer general remarks may be made with regard to it. The mouldings, for the most part of white pine, were wrought in Newport, where they were doubtless designed as well. The panels were of white cedar, often in very large pieces, and the interior, as a whole, was painted.

In the Robinson manor, however, the paneling and stair-rail in the front hall is of black-walnut, left perfectly dead and natural. One of the accompanying measured drawings shows the extreme simplicity and grace with which the hall was treated, both in detail and composition.

A door at the left of the hall opens into the main room, a large and comparatively low room, eighteen by twenty feet. The south and west walls of this room are occupied with windows and a panelled dado, while the north wall contains two doors, and a china-closet, in the form of an apse, with a carved and painted "sunburst" ornament in the quarter sphere, and several shallow shelves for the china. The east wall, which contains the fireplace, is panelled from floor to ceiling, with pleasantly spaced panels.

Around the opening of the fireplace is a frame of exquisite blue-and-white Dutch tiles, which, taken with the cream-colored wood-work, make a very attractive scheme.



In regard to the conception of a fireplace which existed in this pre-Georgian architecture in America, it may be observed that a mantel-shelf over the fire had no part in the arrangement. The absence of this feature is to be observed in every example of the early manors of Narragansett, and the panels are so freely and naturally executed that the conventional shelf is not missed. The simplicity of the arrangement, indeed, is oddly pleasing when seen and gives an indescribable sense of dignity to the whole.

The room above this main living-room is known as the "Lafayette Room," and is for the most part similar to the lower one. The east wall, however, is graced by four slender and pleasantly proportioned pilasters, with quaintly carved heads, and the whole

is painted a rich olive green, which with the Dutch tiles, produces a peculiarly agreeable result.

With the sunny dressing-room opening off of it, this great apartment was, without doubt, quite worthy of the French noble who spent a month at the Robjnson manor during the Revolution.

Beyond these two rooms, little remains in the house that has not been altered beyond all interest, and the original arrangement and plan can only be imperfectly conjectured from the rooms still remaining intact. A doorway here, a boarded fireplace there, a quaint window in some other room suggest further study, but lead to no illuminating conclusions, and one must perforce be contented with such remains as have survived the ruthless "improvements" of generations of rustic tenants.

CHARLES MATLACK PRICE.

The Conflagration Hazard

THE *Proceedings* of the American Society of Civil Engineers for August contains a considerable bulk of interesting discussion of the Society's "Final Report" of the San Francisco catastrophe, from which we make the following extracts:

J. K. FREITAG, ASSOC. M. AM. SOC. C. E.—Referring to the "Report of the Committee on Fire and Earthquake Damage to Buildings," especially that portion dealing with the fire damage, it would seem that certain broad and vital principles relating to fire-resistive construction in general have not been sufficiently emphasized, but have been made of secondary importance to descriptions of damage of mere structural detail, and to consequent recommendations deduced therefrom.

The first conclusion[1] of the Committee is:

"Any deductions from the fire must be those based upon a general conflagration, and not those of an isolated fire. In view of the complete destruction of all materials it becomes a question as to what should be done to make a building fireproof."

This conclusion, although somewhat amplified in a succeeding paragraph, which will be discussed later, seems to place altogether too much emphasis upon the possibility of making an individual structure fire-resisting under conflagration conditions. Previous conflagrations, notably that of Baltimore, have shown the almost utter futility of attempting to cope with fire when once it has reached the proportions of what is generally called a conflagration. No structural materials of which we have present knowledge are equal to the task of resisting successfully such severe test conditions, at least to a point which would justify any reliance which might be placed upon their use.

Further, if the high temperatures, the multitudinous points of attack, and the general impotence of all fire-fighting measures obtainable during a conflagration are to be entirely overcome, then the task of fire-resistive construction is surely a hopeless one, and those interested in fire-resistive principles might well be dismayed at the records of Baltimore and San Francisco. The Committee evidently realized this aspect of the question, for it states[2] that:

"Unless one has been an eye-witness, it is difficult to realize how all materials that men make into the shape of buildings can be so utterly destroyed in a general conflagration."

If, then, that fact is once admitted, as it must surely be by those thoroughly familiar with the tests of fire-resistive methods afforded by the Baltimore and San Francisco conflagrations, the main question becomes, not so much what can be done to make any particular building fireproof, using this or that detail of concrete or terra cotta, or one or another construction of exterior walls or partitions, etc. (though all these points are of immense value as details of the larger problem), but what can and should be done to prevent conflagrations? The Committee's answer to this most vital problem of the American people is far from satisfactory.

Statistics as to the annual fire losses in the United States are probably familiar to all who are interested in building construction. Let it suffice here to recall a few figures. The fire loss in the United States has now approximated $200,000,000 annually for several years, during normal conditions, *i. e.*, years which have not included widespread conflagrations. Add to this direct loss the expense of maintaining fire departments, etc., and the money paid to fire insurance companies in the way of premiums, and it is questionable whether these financial losses do not equal, or even surpass, the value of all new buildings erected throughout the United States within the year for which the comparison is made. Including the San Francisco conflagration loss, the year 1906 becomes an abnormal one, and the fire-waste alone, not counting fire departments or insurance premiums, is estimated at not less than about $506,000,000, while the estimated value of new building operations in the United States for the same year probably approximates $575,000,000. Hence no more vital economic problem is before our people to-day than the lessening of this stupendous drain.

[1]Proceedings, Am. Soc. C. E., for March, 1907, p. 332.
[2]Proceedings, Am. Soc. C. E., for March, 1907, p. 328.

Before considering the responsibility which lay before the community of San Francisco in making impossible a repetition of at least their share of this fire loss, or the same responsibility which lies before all cities, it will be pertinent to inquire into the conditions which made that great calamity (by fire) possible.

The report of the Committee states that:

"San Francisco was built probably in about the same way as other cities. It is an error to say that it was a wooden-frame city, as the business district was generally composed of buildings with brick walls. In among these had been constructed the so-called fireproof structures, exposed on all sides to danger by the burning of the inflammable structures around them."

That San Francisco was not considered by insurance interests to be built "in about the same way as other cities," is made most clear in the Report on the City of San Francisco, issued in October, 1905, by the "Committee of Twenty" of the National Board of Fire Underwriters. The general summary of that report, page 64, reads as follows:

"CONFLAGRATION HAZARD.—Potential Hazard.—In view of the exceptionally large areas, great heights, numerous unprotected openings, general absence of fire-breaks or stops, highly combustible nature of the buildings, many of which have sheathed walls and ceilings, frequency of light-wells and the presence of interspersed frame buildings, the potential hazard is very severe. Probability Feature.—The above features combined with the almost total lack of sprinklers and absence of modern protective devices generally, numerous and mutually aggravating conflagration breeders, high winds, and comparatively narrow streets, make the probability feature alarmingly severe.

"SUMMARY.—While two of the five sections into which the congested-value district is divided involve only a mild conflagration hazard within their own limits, they are badly exposed by the others in which all elements of the conflagration hazard are present to a marked degree. Not only is the hazard extreme within the congested-value district, but it is augmented by the presence of a compact surrounding great-height, large-area frame residence district, itself unmanageable from a fire-fighting standpoint by reason of adverse conditions introduced by the topography. In fact, San Francisco has violated all underwriting traditions and precedent by not burning up. That it has not done so is largely due to the vigilance of the fire department, which cannot be relied upon indefinitely to stave off the inevitable."

The last sentence of this summary has proved only too true a prophecy of the calamity which followed only a few months after the publication of this report.

In discussing particularly the congested-value district, which contained about 2,100 buildings, *Insurance Engineering* gave the following summary of the types of building construction:

Fireproof..........................	2.2 per cent.
Brick and wood joist.................	68.3 " "
Frame construction.....................	29.5 " "

In further description of this area, the same journal stated as follows:

"In the congested-value district there was but one sprinkler equipment, and it was practically obsolete. One hundred and twenty buildings contained stand-pipes and hose, and a few small fire pumps drawing from deep wells. * * * All the fireproof buildings had windows unprotected, and in many cases were badly exposed. About 50 per cent. of the joisted brick buildings had furred and wood-sheathed walls and wood-sheathed ceilings. * * * Large, open light-wells were numerous, and conspicuously prominent on account of their large size and number. Several of the older hotels were literally perforated with them. * * * About 90 per cent. of the entire city and 30 per cent. of the business section were of frame construction, brick buildings being confined almost entirely to the fire limits, and San Francisco could be justly termed a wooden city."

The above criticisms of San Francisco's buildings would be severe enough—indeed far too severe to be pleasant, as applied to any large city—but, when applied to a city in a locality subject to seismic disturbances, the facts become a severe indictment, and show either the indifference of San Francisco's citizens, or the ignorance or carelessness of the Building Department. Municipal regulations (whether or not in a locality subject to earthquakes)

which permit 30 per cent. frame construction within a congested-value district, which permit buildings of masonry walls and timber floors and partitions to be eight stories, or 100 feet high, which permit "large private hotels and apartment-houses of this type," which provide no limitations as to undivided areas, and which allow the "absence of modern protective devices generally," are most certainly insufficient, short-sighted, and unjust, and most particularly unjust to those investors who improve their property by erecting steel-skeleton fire-and-earthquake-resisting buildings, and then have them "exposed on all sides to danger by the burning of the inflammable structures around them."

This brings up the consideration of civic responsibility, as applied to building construction. European cities long ago learned the lesson that safety to the individual means safety to the whole community, and *vice versa*. Witness the most ineffectual fire departments in most continental cities, and, withal, the trifling fire-losses, and, especially, the almost total absence of conflagrations, or even the spread of fire to immediately adjoining property in the cities of civilized Europe. The reason is to be found entirely in the matter of building construction. A building which will prove a menace to neighbors cannot be erected, and the responsibility of the individual as affecting the community is even carried so far in some localities of Europe that the owner of property causing fire damage to neighbors is held financially responsible for such loss.

It is just some such civic responsibility which is needed, and needed very soon, in all large American cities. Responsibility of the individual to the community, which will cause the individual to contribute to the public safety in matters of building construction by erecting structures which will not prove a menace to his neighbors; and responsibility of the community to the individual, in that those investors who improve their land by the erection of costly and permanent structures shall not be allowed to suffer constant hazard through irresponsible neighbors who have no thought or care of their civic duties.

It is now a trite saying that "fire-proof buildings must stand in fire-proof cities," but this statement contains the whole truth of the matter of fire-resistance. If American cities are not to suffer such conflagrations as have occurred at Chicago, Boston, Paterson, Baltimore, and San Francisco, besides many other lesser ones; if the realization of this tremendous financial drain is once grasped in an effort to lessen it; if it be admitted that isolated buildings surrounded by severe risks cannot withstand conflagration conditions, then the achievement of fire-proof cities (or at least the congested areas therein) must be made possible by uniform fire-resisting construction throughout.

Touching upon this point the Committee states as follows:

"The only statement that can be offered is that the best insurance for buildings would be the isolation of a district containing nothing but fireproof structures. A general conflagration would then be impossible. Manifestly, this is impossible in San Francisco, where business must be resumed with the least cost. In many cities it would be good insurance for men owning large buildings to combine to buy out old and inflammable structures, either demolishing or rebuilding them. Otherwise, there remains the danger of general conflagrations, such as those at Baltimore and San Francisco, in which fireproof buildings will be injured from 30 to 60 per cent."

With the first statement, regarding the isolation of congested districts to contain nothing but fire-proof structures, the speaker most heartily concurs, not only because such practice would afford the "best insurance for buildings," but also because it would afford a maximum of safety and assurance for the whole community. With the statement, however, that "this is impossible in San Francisco, where business must be resumed with the least cost," or, indeed, that uniform fire-resisting construction is impossible in any city ready to take the lead; and also with the suggestion that "it would be good insurance for men owning large buildings to combine to buy out old and inflammable structures," etc., instead of throwing some such responsibility upon the city itself, the speaker begs to take most decided exception.

In the United States we are so prone to consider the rights of the individual that we are apt to overlook the rights of the aggregation of individuals. It is not denied that municipal building regulations adopted by any city, requiring uniform fire-resistive building construction after any fixed date, would give rise to seeming injustice and hardship, but if laws requiring the remodeling of present risks were also rigidly enforced, in addition to laws covering the erection of new buildings, the hardships would soon be equalized, and benefit accrue to the community in the way of reduced fire losses, reduced insurance premiums, reduced expenses for maintaining fire-fighting equipments, and added security to life and property interests.

"The fire problem, meanwhile, is with us, and it is not only for future buildings that we are concerned, but with those that exist at present. Out of 300,000 buildings in the Metropolitan district (New York) not more than 2,000 are classed as thoroughly incombustible. With the remaining 298,000 we have got to deal. That these buildings can be made practically fire-proof—the word is used advisedly—is a statement which is not only capable of demonstration, but has already been demonstrated by fire experience.

"To safeguard these buildings is an engineering proposition pure and simple. The knowledge and ability are available, and there is required simply a desire on the part of occupants and property owners. A very large percentage of the causes of fires is known, and can be eliminated from a building; there are on the market devices and systems of proved worth for detecting such fires as do occur, and for extinguishing them by automatic or manual means; a building can be planned to limit the area of fire; it can be prepared to facilitate the work of the public fire-department; it can be prepared to reduce the loss resulting from fire and water, and thereby reduce the fire tax. This outlined plan makes a standard for judging fire conditions, and if applied to any particular building, it would register in a definite and precise form the degree of consideration which the owner or occupant has given to the danger of fire."[1]

(To be continued.)

Westminster Abbey

THE following letter from Mr. James King, B.D., has been published recently in the *Scotsman:*

"Professor Lethaby, the present surveyor of the fabric of Westminster Abbey, has arrived at the conviction that 'the church must be held by Englishmen as the supreme work of art in the world.' This may be but a pleasing fiction, flattering to our national pride, and will not be unanimously endorsed by those acquainted with the glorious churches of France and Italy. By a careful study of the roll of accounts for the building of the abbey, the Professor has brought to light the actual names of the craftsmen who reared this magnificent church and chapter-house of Henry III., built above six centuries ago—during the latter half of the thirteenth century. Thus we are informed that Henry of Westminster, the King's Mason, was in charge of the works from 1244 (the year when Edward the Confessor's church was pulled down) to 1253, and was the architect of the presbytery and transepts; that John of Gloucester reared the bays of the choir, immediately west of the transepts, including the beautiful shield of arms on the wall arcade of the aisles; that Robert of Beverley completed the choir; while Henry Yevele completed the new nave, which was not completed for two centuries. It thus appears that the workmanship of the abbey was carried out by English craftsmen hailing from English towns, even at that early period possessing glorious minsters; but it is evident from the edifice itself that the handsome apse, the lofty vaulting, the radiating choir chapels and the triple portals of the main entrance are imitations of French Gothic architecture. Our English architects of that period were wedded to the square east end of churches, as may be seen in English cathedrals and Scottish abbeys, while French architects were devoted to the apse form or *chevet,* the development of which was the chief glory of the French Gothic, such as may be seen on Westminster Abbey. The immense height of the vaulting, roof and towers reaching toward heaven, is a conspicuous aim of French architects, while the frequent adoption of light flying-buttresses gives the edifice a more aerial character. The existence of radiating chapels round the apse, primarily to admit light to the choir, is a French characteristic, and those of Westminster Abbey are declared by Mr. Lethaby to be 'the most perfect works of central Gothic architecture in England.' Double aisles, ambulatories and entrances with triple portals had their origin in France. In the century preceding the building of Westminster Abbey many beautiful churches rose in beauty in the north of France. Thus St. Denis, the burial-place of the early kings; Notre Dame, with its handsome apse and model façade; Chartres, with its imposing interior and majestic towers; Rheims, with its wealth of decoration; Amiens, with its graceful dignity and quiet harmony; Beauvais, with its gigantic choir and lofty vaulting, are all temples of exquisite beauty and indicate the high-water-mark of Gothic art in France. These sanctuaries were for the most part built during the long reign and under the fostering care of King Philip Augustus, who died in 1223, about a generation before the present Westminster Abbey was founded. The building zeal of Philip Augustus and that of Louis IX., better known as St. Louis, who built Sainte Chapelle, Paris, fired Henry III. with a great desire to make Westminster Abbey a temple exceeding magnifical, and, although there is a saying that the choir of Beauvais, the nave of Amiens, the portals of Rheims and the towers of Chartres would together make the finest church in the world, yet many will endorse Mr. Lethaby's opinion that for quiet beauty and graceful simplicity 'Westminster Abbey is the supreme work of art in the world.'"

[1] "The Journal of Fire."

The Danger of Using Rusty Iron in Reinforced Concrete

THE following interesting communication from Mr. W. H. Brown, of York, England, has been published by several of the English architectural journals:

THE DANGER OF USING RUSTY IRON IN REINFORCED CONCRETE.

Many writers on reinforced concrete assert that there is no danger in using iron with a slight coating of rust; others emphasize the fact and cite experimental data to prove that a coating of rust is a distinct advantage, inasmuch as the chemical action between the concrete and rusty iron forms a coating of silicate of iron which not only protects it from rust, but also removes any little rust that may be on the iron when placed in the concrete. The presumable advantage is the greater adhesion of the two materials in consequence of the roughened surface of the reinforcement.

A vital point, which will in time make itself painfully apparent, is here entirely lost sight of. Suppose rusty bars (and they usually are rusty) are used in the construction of a beam and are properly seated in the stirrups at, say, twenty points along its length, each stirrup being from 1 inch to 2 inches in width, how is it possible for the above-mentioned chemical action to take place?

Obviously if the bars are properly seated in the stirrups, as they should be to be effective, the cement cannot reach the bar, and consequently no protecting coating of silicate of iron can be formed at these points, as is proved by the following experiment:

In May, 1906, being engaged in the construction of a large reinforced-concrete factory, and designing others, I had reason to doubt the advisability of using iron even partially rusted. I therefore had inserted in a block of concrete a bar of iron covered with a slight coating of rust, firmly seated in a stirrup which was entirely free from rust, and its mill face undamaged and unscratched. Recently I have had the block broken up, and find at the point of contact between bar and stirrup that not only has the bar continued to rust, but the stirrup has commenced to rust also. It is obvious that in a few years the stirrup at least will be eaten through, with only one result.

ILLUSTRATIONS

HOUSE OF JOHN F. DODGE, ESQ., BOSTON BOULEVARD, DETROIT, MICH. MESSRS. SMITH, HINCHMAN & GRYLLS, ARCHITECTS, DETROIT, MICH.: TWO PLATES.

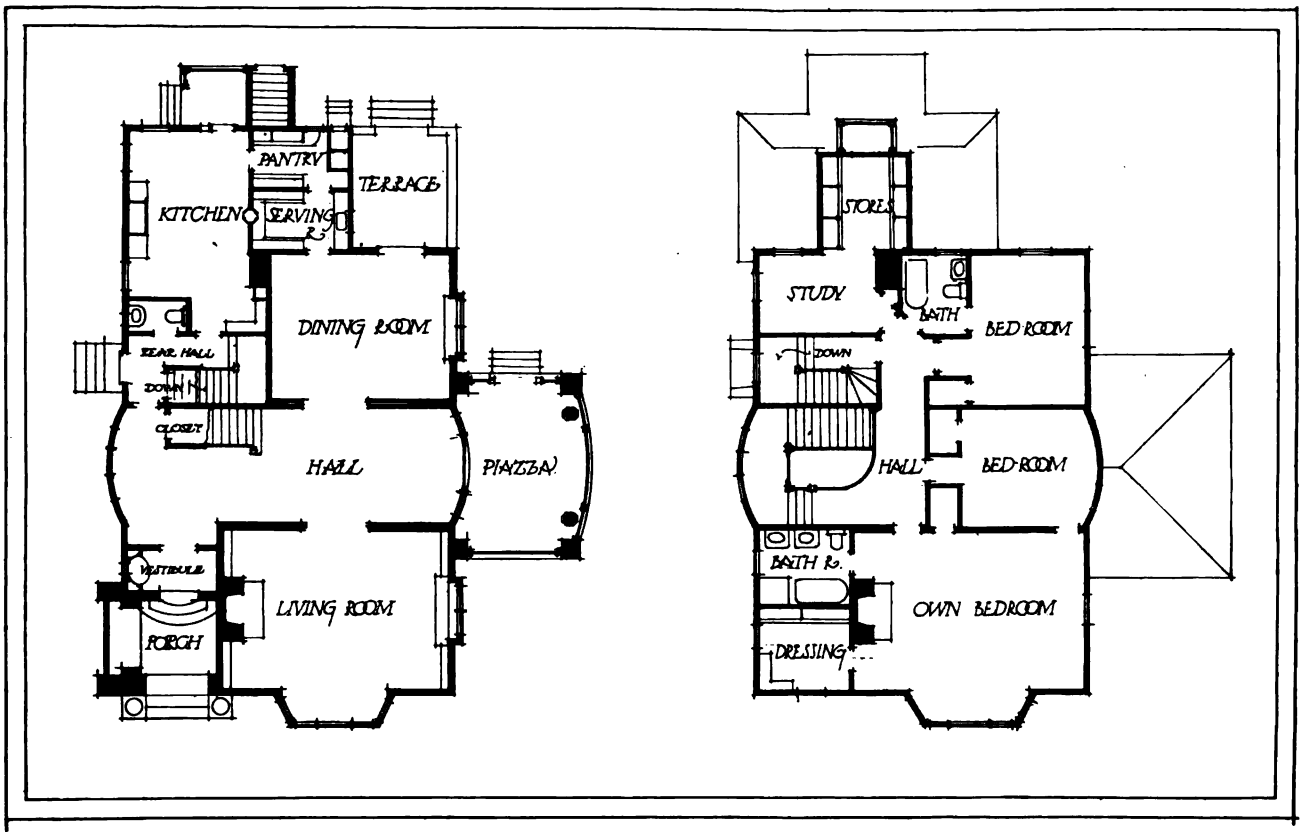
The exterior of this house is of rough, mottled Roman pressed brick and Bedford-stone trimmings, with the gables and portions of the second story finished with plaster and timber-work. The roof is of Spanish tile.

The living room and "den" are finished in natural English oak. The main hall, dining-room and other portions of the first floor in quarter-sawed oak, with paneled walls and ceilings. The second floor is finished in enamel throughout.

HOUSE OF ALBERT EASTWOOD, ESQ., ROCHESTER, N. Y. MR. CLAUDE FAYETTE BRAGDON, ARCHITECT, ROCHESTER, N. Y.: TWO PLATES.

ITALIAN TOMBS: FOUR PLATES.

As the next installment of Professor Melani's paper on Italian tombs calls for a greater number of illustrations than we care to carry in a single issue, we here publish a certain number of these interesting subjects which will be referred to next week in their proper place.



PLANS: HOUSE OF ALBERT EASTWOOD, ESQ., ROCHESTER, N. Y. C. F. BRAGDON, ARCHITECT.

Additional Illustrations in the International Edition.

ENTRANCE PORCH. HOUSE OF ALBERT EASTWOOD, ESQ., ROCHESTER, N. Y.

ENTRANCE PAVILION: HOUSE OF JOHN F. DODGE, ESQ., DETROIT, MICH.

NOTES AND CLIPPINGS

DAMAGE DONE BY AN IVY-PLANT.—An ivy-plant which established itself in a crevice of the tower of St. John the Baptist's Church, Yarborough, Lincolnshire, has caused such damage that an architect who has been consulted estimates that £600 will be required to put the tower in a good state. The roots undermined the foundations, gradually lifting the stones out of place, and a large crack in the walls resulted from the growth of the plant.—*Building News.*

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IT is worth while to point out, since reforms can be brought about only by repeated iteration of advice and argument, that in their discussion of the conflagration hazard Mr. Freitag, last week, and Mr. Goad, this week, make the same point we have made several times of late. Mr. Freitag, in so many words, insists, as we have, that it is the duty of the community to protect itself at its common cost from the dangers of general conflagrations, while Mr. Goad shows how even the fatalistic Turk has sought safety from the conflagration hazard by building stone fire-walls forty feet high, whose function is to prevent fires occurring in the lumber district from spreading to other parts of the city of Constantinople. The Turk, who hesitates to attempt to put out a fire in his own house because it is "kismet," has the good sense to build public fire-walls, while the New Yorker, active-minded, ever eager to venture his money in promoting any and every modern invention that comes along, above all things a scoffer at Old World practices and a scorner of the theory of fatalism, is, when it comes to the matter of protecting his own community from fire, more fatalistic than the Turk. The Turk, if he occupied Manhattan Island, would be likely to build solid fire-walls from river to river. The intelligent American could and should show his modernity and improve on the Turkish model by building in place of unprofitable stone walls a series of municipally built and owned rows of really fireproof buildings stretching from river to river, every mile or so.

THE Boston *Advertiser* shrewdly remarks that "the danger of lofty buildings from the fire-menace will never be convincingly settled until it is settled against the safety of such buildings," because each time such a structure successfully withstands the assault of fire the disbelievers protest that nothing has been proved against their own contention, since the conditions were not what they might easily have been, the test not sufficiently crucial. We regret extremely the existence of the "skyscraper." We resent its intrusion into modern life. We would gladly do all we could to prohibit the erection of another one under the present untrammelled license, whether in New York or elsewhere, but our opposition rests solely on hygienic and artistic grounds. We accept it as proved that the "high building" can be erected safely to almost any height, and that, under competent oversight and with the expenditure of enough money, it can be made safe from fire. But the erection of a series of these Brobdignagian buildings giving on our present Liliputian streets is a matter of grave concern to hygienists, and is already producing serious difficulty in the prompt circulation of traffic and the safety of those who, discharged from these extra-populous hives at the same hour, overcrowd street-crossings, vehicles and railroad-stations.

AS to the artistic side, it is the fashion for the newspaper reporters—veritable parrots—to dilate upon the marvellous silhouette of lower New York as seen from incoming vessels, and they eagerly question this celebrity or that as to the impression made upon them by the scene, without stopping to consider whether the celebrity's opinion on such a matter is of any value whatever. So New Yorkers have come to believe that the skyscraper has improved the city's reputation as a "city beautiful." But the fact is that to a person of sensibility and artistic perception the sight of New York from harbor or river is simply depressing, and conduces to much melancholy. The world does not afford a more inartistic aspect than is afforded by this vaunting of a sheer materialism—American? Yes, intensely American, these jagged, featureless prisms stood on end. As for "silhouette," one just as artistic can be had any day by descending into an excavation and taking a sight across a forest of driven piles before they are sawed off to grade. All this might be bettered, if the law should restrict high buildings to the pyramidal form suggested by Mr. Carrère or to erection on sites in the middle of each block, as we have urged. In either case the architect's efforts would have a fair chance to "count" and the silhouette of the city might be a real thing of beauty, in place of a mere formless jumble as now, a veritable jungle that even Kipling could not poetize.

JUST as the Quaker maiden, when she abandons the "plain people" and goes "out into the world," is rather apt to overindulge her too-chastened tastes by clothing herself in too bright and ill-assorted colors, so Philadelphia, when it decided to house itself no longer in prim brick cubicles, with their meagre white marble finish and solidly-shuttered windows, entered on a veritable architectural debauch—and some of the intoxicating liquor still lingers above the lees. All at once there ap-

peared the startling architectural manifestation of Frank Furness's pre-Raphaelite interpretation of Gothic forms and principles, and for a short time the staid citizens could not have enough of it. But presently it was discovered that the movement was altogether too extreme, and then the architects of the day began to grope, but always they strained after novelty—in the search perhaps for an American style—and until very recently they have continued to grope, realizing dreams that ranged through all shades and degrees of grotesquery and eccentricity, until at length there was achieved that masterpiece of misbegotten conception that enabled the squandering of needed millions, the Philadelphia "Public Buildings," the city-hall, with its Quaker-crowned tower. Here again there was a pause and a desire, at least, for reaction, and, fortunately, just about this time the product of the American architectural schools were able to get a footing on the stage, and their training, supplemented by European study and the example of what was being done in other American cities, was able to produce such results that the underlying American common-sense could not miss the lesson, and little by little the tawdry, overdressed experiments in design are giving way to better things.

ONE of the Philadelphia architects, whose fate it was to do a good deal of the groping to which we refer, was Willis G. Hale, who died recently in his fifty-ninth year, and this chronological statement at once declares that it was not in his power to profit by those educational facilities that are now within the reach of anyone who desires to devote himself to the art of building, and this fact should be kept in mind when considering his work. If his buildings are a little too florid for the current taste, it must be remembered that he was urged on by competition with others who also believed in over-elaboration and eccentricity. It was his fortune, too, to have as clients a number of men whose desire to spend their easily gotten millions was not controlled by education or inherited standards of taste, and to this fact should be attributed some of the lack of restraint that marked his work. Besides being a facile designer, Mr. Hale was greatly interested in music, and was a vocalist of distinction. The *Record* Building, the Independence National Bank, the Keystone National Bank, the Weightman Building, the Schuylkill Navy Club-house, and the Widener and Elkins houses are among the best known of his buildings.

THE stirring of a certain reminiscent romantic admiration one always feels on learning of the death of an acquaintance who took part in the Civil War seems, somehow, to be rather quickened in the case of one who fought for the "lost cause," and so may have later led a needlessly embittered life. This was not at all the case with Robert I. Fleming, an architect who died last week in Washington in his sixty-sixth year, for after having served in the Fayette Artillery of Richmond, taking part in thirty engagements, he very shortly after the close of the war took up his residence in Washington and there entered actively on the duties of a good citizen. He was always much interested in every movement designed to promote the growth or better the artistic character of the city, being at one time a member of the District of Columbia Legislature in the days before Congress took direct control of the affairs of the District. Mr. Fleming not only acted as architect, but also as contractor and builder, and in his later years operated in real estate at a considerable scale.

A SHORT time ago, in discussing the various ways in which an architect might procure work and consequent fame, we pointed out that one of the surest ways, for a patient man, was to settle in a new and promising community and grow up with it. This course was followed by Edward S. Hammatt, F.A.I.A., who died recently in his fifty-first year. Twenty-five years ago one would hardly have picked out the town of Davenport, Ia., as offering exceptional chances to a young architect, but Mr. Hammatt selected it as the scene of his operations after completing his preparatory studies in the offices of sundry Boston and New York architects, and by patient effort, conscientious attention to the claims of his clients and the due exercise of his professional skill, succeeded in building up a considerable practice, which was by no means confined to his own city and State, for he is credited with the design of a number of schools in Rock Island, a church and several business buildings in Moline and other works still farther afield. Quite apart from the merit of his work, the community in which he lived and his fellow professionals as well have reason to be grateful for his setting and maintaining the standard of professional endeavor at a high level.

IN these days the public is so confused by seeing executive officials grasp and exercise, unrebuked, powers that the ordinary citizen is quite sure are unlawfully exercised that, even though our judges are men who do respect the letter and spirit of the law, we cannot help feeling that one of them has stretched his powers without proper justification. It is unquestionable that the clacking of the active steam-drill is annoying, particularly in the summer-time when the windows are open, and when the noise really interferes with the orderly dispensing of justice it is plain that the noise becomes a grievance which, possibly, the law has a right to abate; but it should do so only in an orderly and legal manner. Recently the justice sitting in a New York court found his peace and comfort disturbed by the clattering of drills in an adjacent excavation and, so, sent out an order that the noise should cease. As no notice was paid to the request, the judge called an officer and told him to arrest the foreman and bring him into court. This done, the judge informed the frightened man that he was under arrest "for contempt of court!" for, said the judge, "I made an agreement with your contractor yesterday that he should stop at 10.30." If words mean anything, it seems to us that all that could be complained of was a breach of contract, and that is a civil, not a criminal, offense. The court apparently had issued no order, so the foreman could not be in contempt. Nevertheless, he was sent "downstairs" in arrest and the noise was stopped. The incident is but one of the many involving the principle of *ultra vires* that occur so rapidly nowadays, when personal whim is allowed to usurp the function of legally ordained form.

Italian Tombs—II

Renaissance

AND now we come to the Renaissance, and a Florentine artist has already shown us at Naples the first elements of Classic architecture with which Tuscany greeted the new effort in Italy. Yet there is a great difference between the tomb in S. Giovanni à Carbonara and the Florentine manifestation of the early Renaissance, and if we turn our eyes on the charming mural tablet in the Badia Fiesolana, the ancient Cathedral of

MEDICEAN MURAL TABLET IN THE BADIA FIESOLANA.

MURAL TABLET TO FRA FILIPPO LIPPI IN THE CATHEDRAL, SPOLETO.

Fiesole, one can easily appreciate this. This is a work, profoundly Classic, that yet retains a certain Gothic meagreness that is quite characteristic of our Primitives. Generally the authorship of the Badia, where this tablet with its Medicean device is to be found, is attributed to Brunelleschi, but the attribution is disputed, since the building of the Badia was not begun until 1456, or ten years after the death of the great architect. At the same time, it cannot be denied that he may have left drawings that his successors, amongst them Bruoso and Benedetto da Fiesole, were glad to respect. In the history of Italian art there is aburdance of traditions; one of them is this absolute ascription of the Badia Fiesolana to Brunelleschi and another is that which ascribes to Brunelleschi's friend and companion, Donatello, the superb tombstone of the diplomat and cardinal Angelo Acciaioli (1419), amongst the tombs of that family in the crypt of the Certosa at Florence. This time it is well to be guarded in assenting to the Donattellesque ascription. The art of Ghiberti is not to be overlooked in the superb stone that we illustrate, a unique specimen in this kind of tomb and one of great beauty. From the point of view of paternity, we are much better fortified in the case of the tomb of Carlo Marsuppini (1455) in Sta. Croce, Florence, the author being Desiderio da Settignano. Here we are in the presence of a typical tomb, one of the most celebrated of the funerary monuments of its time. Never did decorative sculpture exhibit such dash and richness. Desiderio do Settignano imitated a tomb in the same church, the Pantheon of Illustrious Italians, erected by Bernardo Gamberelli, but surpassed the original so far as to create practically the fundamental type of the fifteenth-century tomb, which found and to-day still finds many imitators. At

TOMB OF ANGIOLO ACCIAIOLO IN THE CERTOSA, FLORENCE.

Bologna a sixteenth century artist reproduced the Marsuppini tomb almost line for line, but not having attained the formal beauty of the monument in Sta. Croce his work is far below the worth of that of Settignano, wherein is especially to be remarked the elegant form of the sarcophagus, the exquisite execution of the foliated forms that decorate it and the adorable little infant figures at either side.

Of quite a different type is the tomb of Giovanni and Piero de' Medici, designed and executed about 1472 by Verrocchio, a masterpiece of an admirable artist, one which cannot be passed without a word of praise: the sarcophagus, of porphyry, supported on bronze lions' paws, which develop upwards in volutes and leafage, has above it a grillage of bronze cordage, filling in the enclosing arch. The tomb is to be found in the Church of S. Lorenzo, Florence. To the same author must be attributed the tomb of Cardinal Forteguerri (1477), in the Cathedral of Pistoja. But though Verrocchio made the clay model for the tomb (now in South Kensington Museum) he is not responsible for the execution of the work, as this was carried out by some of his collaborators. During the Barocco times the tomb was enframed with the volutes and curtains that now impair its interest.

Choosing from amongst tombs which not only are magnificent but also have a real character of their own, here is the celebrated tomb of Maria of Aragon in the Church of the Monte Oliveto, at Naples, a replica of the tomb of Cardinal Giovanni di Portogallo in S. Miniato, Florence, by Rossellino. The co-operation of Benedetto da Maiano in the execution of this tomb is shown by the graceful and conscientious workmanship of the reliefs.

Being at Naples now, I am reminded of having drawn attention to the motive sometimes employed in Gothic and Tuscan tombs, curtains drawn aside by angels and exposing a recumbent figure stretched upon a sepulchral couch, so now I will introduce the tomb of Beata Villana in Sta. Maria Novella at Florence, by Bernardo Gamberelli (1451). This is a tomb of the highest merit, where the saint stretched out below the mortuary drapery recalls the fairest pages of the record of

Florentine sculpture of the Quattrocento, the fine quality of which is also exhibited by two very significant tombs by Matteo Civitali in the Cathedral of Lucca.

Lucca, the birthplace of this celebrated sculptor and architect, thoroughly appreciated the possession of so illustrious a son. His tomb of Pietro Noceto in the Cathedral, inspired by the tombs of Bruni and Marsuppini in Sta. Croce, not too happy in their proportions, is not so successful as the modest tomb of Domenico Bertini (1479), where the simple ordonnance is arranged so as to give the greatest value to the bust of Bertini: good taste and individuality are the characteristics of this work. The bust, also by Civitali, is simply a chef d'œuvre and since its style is recalled by the bust of Bishop Salutati on his tomb in the Cathedral of Fiesole I have elsewhere hazarded the suggestion that the sculptor of the latter may have been Civitali, of whose youth and apprenticeship in Florence little is known. The tomb of Salutati, which itself is by Mina da Fiesole, may easily have had adjoined to it a bust by Civitali: and if the words on the console that supports the bust, OPUS MINI, are not an erroneous ascription, Mino, who enjoys a reputation superior to his real deserts, has here his best work, his real chef d'œuvre. The beautiful ordonnance and treatment of the sarcophagus deserve study.

TOMB OF CARDINAL FORTEGUERRI IN THE CATHEDRAL, PISTOJA.
VERROCHIO, SCULPTOR.

Architecture, which is so skilfully displayed in some of the artistic tombs, quite outdoes itself in the tomb of the Doge Vendramin in Venice, which is credited to Alessandro Leopardi, but is really due to Antonio and Tullio Lombardo. This inspiring tomb, erected in SS. Giovanni è Paolo and once gilded, after the fashion of the tomb of Marsuppini in Sta. Croce, occupies the same rank in the funerary art of Venetia that the tomb of Desiderio da Settignano holds in the art of Tuscany. This being said, it is useless to add further words of praise.

Venice, which everywhere manifested a sense of sumptuousness, erected during the Renaissance tombs that were even richer than this, such as the tomb of the Doge Nicollò Tron in the Frari, a structure which is magnificent to the verge of extravagance. This tomb, wh. . in its general architectural treatment has somewhat the air of a church façade, is due to Antonio Rizzo, a statuary more skilful with the chisel than he was honest—he was banished because of certain indelicacies committed by him while he was acting as architect of the Ducal Palace—and is one of the happiest sculptural expressions of its epoch.

I should have to expend many words if I undertook to describe all the tombs herewith illustrated, but amongst them, besides the terra-cotta tomb of Cesare Nacci, executed between 1470 and 1480 by Vincenzo Onofri in the Church of S. Petronio at Bologna, which, in the sarcophagus at the top of the monument, recalls the Marsuppini sarcophagus; besides the mural tablet in honor of Fra Lippi, by an unknown artist, in the Cathedral of Spoleto, erected by the order of Lorenzo de' Medici, not ill done, but somewhat singular; and besides Antonello Gagini's tomb of Antonio Sirotta, dating about 1527, in the Church of S. Cita at Palermo, there are two Renaissance tombs that have quite peculiar attractions, one the tomb or tombs of Giuliano and Lorenzo de' Medici in the new sacristy of S. Lorenzo at Florence, executed by Michael Angelo, and the great tomb of Giangaleazzo Visconti in the Certosa at Pavia.

TOMB OF CESARE NACCI, S. PETRONIO, BOLOGNA.
VINCENZO ONOFRI, SCULPTOR.

On the tombs by Michael Angelo, where architecture is associated with sculpture, yet where the latter soars far above the art of the compass with a power almost divine, on these sculptures executed by Buonarotti in the first half of the sixteenth century, much has been written. If space allowed, I might say something as to a new interpretation that, just now, it is sought to give to these *Michelangeloesque* figures. Every one considers them to be the personification of Night and Day, Dawn and Dusk, but Herr Steinmann, in a volume recently published at Leipsic, tries to demonstrate that these four figures typify the four temperaments described by the old author, Lasca—the sanguine temperament shown by Night, the melancholic by Dawn, the choleric by Day, and the serene by Dusk. In the same way he declares that the titular figures stand not for Giuliano, the victim of the Pazzi, and not for Lorenzo the Magnificent, but for Force and

Chagrin. As Herr Steinmann is a serious scholar, I should like to discuss his theories, if this were the proper place to do so.

The tomb in the Certosa at Pavia, isolated as is the Gothic tomb of Cansignorio at Verona, is the most majestic tomb in Lombardy, and so they name it "the mausoleum" of Giangaleazzo. The rich tabernacle under which rests the sarcophagus of the founder of the Certosa is the work of Cristoforo Romano, who executed it between 1492 and 1497. This master architect, sculptor, antiquary and counsellor of the celebrated Isabella d'Este had several associates in executing the monument: thus the statue of the Virgin at the top is by Francesco Briosco, the architect Galeazzo Alessi about 1560 designed the sarcophagus, while its guarding figures, the angels Fame and Victory, were carved by Bernardino da Novate. Thus the Mausoleum of Giangaliazzo in the Certosa at Pavia brings us to the time of the full Barocco period, thanks to the abounding vitality of Alessi, the contemporary of Giorgio Vasari, both so devotedly "Michelangeloesques" that the latter, architect, painter and writer, made the design for the tomb of Michael Angelo himself now in Sta. Croce, finished in 1570 with its statues, "Architecture" by Giovanni dell'Opera, "Sculpture" by Cioli, and "Painting" by Lorenzi.[1] In the same category architecturally must be placed the tomb of Pope Niccolò IV. in the Church of Sta. Maria Maggiore at Rome, designed by Domenico Fontana. Though chronologically far removed from the celebrated and sumptuous tombs created by Giovanni Lorenzo Bernini, it excelled those tombs of his which exhibit so clearly the influence of the sculptor of the "Moses." Michael Angelo elevated the reputation of the statuary by his famous tombs at Florence and at Rome, in S. Pietro in Vincoli, and these examples could not be sterile of influence; Bernini, the Michael Angelo of his time, surely owes something to his great predecessor.

[1]In the eighteenth century the tomb was opened, the body of the great artist being found intact and well preserved, as was the green velvet of his clothing, a fact which served to substantiate the tradition that bodies buried in Sta. Croce are incorruptible.

INTERIOR OF THE MEDICI CHAPEL, FLORENCE.

INTERICR OF THE CHAPEL OF THE PRINCES, FLORENCE.

The Neopolitan master, Bernini, endowed with a limitless fancy, did not, as did certain Venetian artists, sacrifice the architectonic line to the movement of the sculpture: he always preferred to have the architecture of his tombs set off the value of his sculpture and knew how in a surprising way to blend together the architecture and the sculpture by making use of secondary elements of decoration, such as the draperies so successfully used in the tomb of Pope Alexander VII. (1655), which, with the tomb of Pope Urbain VIII.—both in St. Peter's—marks the apogee of Bernini's powers.

The architectural tradition of the great *"machines,"* with columns and entablatures, is here represented by the famous Venetian tomb of the Doge Giovanni Pesaro (1669) in the Church of the Frari, the work of Baldassare Longhena. A Saxon artist, Melchiozze Barthel, carved the four Moors, who, in white marble breeches, torn here and there to allow one to see the black legs beneath, support, Atlas-fashion, the main entablature.

After so much richness as here, I hardly dare conduct the reader to that further extravagance that is found at Florence in the Chapel of the Medici Princes in an amount and degree not to be surpassed. Here we have walls encrusted with marbles and fine stones, green and yellow jasper from Sicily, violet marble from Flanders, coralline from Spain, porphyry and granite from Elba, while the sarcophagi themselves have inscriptions in chalcedony.

Through this notable chapel, the foundations of which were laid in 1610, we now reach the peaceful calm of Antonio Canova, the high-priest of Italian Neo-Classicism—Canova, whose tomb of Clement XIII., wrought with so much majesty, writers on art have known how to value properly, the cold beauty of its statues as well as the life-likeness of the lions, the finest lions of modern Italian art.

Here, having at length rejoined a safe company, I can afford to stop.

ALFREDO MELANI.

The Conflagration Hazard—II

CHARLES E. GOAD, M. AM. SOC. C. E. (by letter).—Conflagrations seem to be prevalent chiefly in that portion of the North American Continent inhabited by the Anglo-Saxon race, mainly owing to the "inordinate greed of immediate gain" that characterizes the construction of rapidly growing centers of population.

There are from 5,000 to 6,000 cities, towns and villages, in the United States and Canada, in continual danger of being swept by fire; thus it would seem reasonable that the question of the "Best Means for the Prevention of Conflagrations" should have serious consideration by all persons interested in the welfare of the community.

This subject is worthy of the attention of the American Society of Civil Engineers. Statistics, easily obtainable, show that the fire wastes by conflagrations (besides those caused by ordinary isolated fires) are appalling. More than 1,000,000 buildings in 10 years, says one authority; in 39 years (1866 to 1904) more than $542,000,000 of fire waste in conflagrations alone.

How often have we, who know these dangers, walked through the congested districts of our principal cities and towns, wondering why they still existed; and, on seeing "fire-traps" and "sources of danger" being hurriedly run up, do we not frequently wish for a dictator's power to stop such rash and foolish construction?

The natural foes to be met by civil engineers are taken to be water and decay. Fire, usually considered as a servant, should be regarded with more attention as a possible enemy. After a serious conflagration, there always ensues a period of "proposed amendments and improvements," all too soon forgotten when the temporary panic has ceased.

The chief "physical" preventions to the spread of conflagration may be summarized as:

1.—Impervious walls and fire-resisting construction;

2.—Wide, and open spaces;

3.—Abundance of water, concentrated at the proper place, at the right moment.

The chief "moral" preventive is:

To have officials (more than one) with knowledge of how to act, and with authority sufficient to obtain immediate organized help.

Impervious Walls.—Much can be done by insisting that, in certain districts well known as liable to conflagration hazard, some walls should be constructed so as to prove a barrier to a fire that has become temporarily beyond control.

There is one good wall in the heart of London City that has already to its credit the stay of conflagrations in five instances, and the members of the fire brigade hail with delight the aid of their "old friend," when a fierce fire meets it again.

The London County Council is gradually introducing by-laws making improvements in this direction, and there is a tendency among municipal authorities to consider these matters on a more comprehensive scale.

Not only vertical, but also horizontal, fire-breaks are worthy of attention. Since the Cripplegate fire (London, November, 1897), building acts have been amended so that every alternate floor in that district must now be fire-resisting.

In the old City of Stamboul, the Turkish part of Constantinople, two stone walls, 40 feet high, have been erected in the "Lumber District," and more are needed.

The European suburb, across the Bosphorus, Kadi-Keui, consisting mainly of buildings of wooden construction, appears to have laws which compel the construction of a brick wall, without openings, on one side of a wooden building. While it looks curious, and somewhat absurd to a chance visitor, to see a dead brick wall on one side of a wooden building, with nothing but vacant fields for 500 feet distant, yet had such a law been enforced in communities of wooden structures on this Continent, before buildings became grouped in closely congested areas, the aid to the prevention of conflagrations would be obvious.

Wide, Open Spaces.—After every conflagration, efforts are made to increase the width of streets, and to open wide, new thoroughfares, but, as a rule, "vested interests" prove too apathetic, and nothing is accomplished.

After the Great Fire of London (September, 1666) Sir Christopher Wren urged the construction of wide thoroughfares, and prepared a plan, the adoption of which would have been of immense benefit; but he was too far in advance of his age, and his plans were not carried out.

St. John's and Carbonear, Newfoundland, are instances where "fire-breaks" of great width, but of too limited an extent, were adopted after serious fires.

Our forefathers in New England and in the Maritime Provinces usually managed to allow sufficient space between wooden buildings in order to prevent conflagrations; but now-a-days the greed for immediate gain is such that fire-traps are allowed to be run up in close proximity to each other, and the danger is overlooked, or, if considered, is merely inadequately guarded against by fire-insurance.

It would be well within the powers of hundreds of towns and villages that are springing up all over the country, to forbid the erection of wooden buildings within 50 feet of one another, until such time as proper fire-resisting walls were built to intervene between them. The same rule should apply to suburbs of cities consisting of wooden buildings, wide thoroughfares being made wherever practicable, the widening of all principal streets being encouraged, even if at an apparently extraordinary expense.

Dynamiting Buildings.—This method is considered to be poor policy in staying a conflagration, as the shattered, disintegrated mass is the more easily ignited, and windows, hundreds of yards away, are blown in, affording ready access to burning embers.

Abundance of Water.—A lesson to be learned from the record of nearly every conflagration is, that the control of the water-supply should be such that, in time of need, certain sections could be supplemented by an increased volume of water, and that it should be practicable to cut off each section in which the firemen have been driven from the hydrants without having had time to close them.

The old-fashioned system of underground water cisterns had many advantages, though, where water-works have been installed, these cisterns have generally been abandoned as unnecessary. In the case of failure of water systems through earthquake, accident, or malicious interference, however, the supply from cisterns would be an important factor in the fight against a sweeping conflagration.

Ponds, or small artificial lakes, in central squares, while beautifying the city or town, would also serve a useful purpose in times of conflagration. A small quantity of water judiciously used can be made to accomplish great results; this is known from actual experience.

The "Moral Preventive."—The moral preventive is to prepare for war in times of peace—to have men trained to meet a disaster —not merely one chief, who (as in many instances of late) may be incapacitated by accident, or who may be absent, but several. These men should be trained to work together, and should have a thorough knowledge of the water systems and of possible fire-breaks; they should be always in readiness to take action at the time, instead of, as is now too often the case, each one acting in such a manner as to retard the efforts of the others by want of knowledge and lack of previous instructions.

The managers of fire-insurance companies frequently do good work in preventing conflagrations, though they are usually roundly abused for increasing the rates; they would deserve commendation if they not only would raise the rates, but would also make them prohibitive, or if they would decline to insure in districts which seem designed to foster the spread of conflagrations. This is now actually done by some managers, yet the majority will still accept such risks, and assist in the continuance of careless and "tinder-box" construction.

The British Fire Prevention Committee, founded in 1897, composed of architects, civil engineers, district surveyors, etc., in Great Britain, is doing valuable work in inculcating better methods of construction, with special reference to resistance to the spread of fire; its reports (now numbering 120) of fire tests, and of matters pertaining to this subject, will be of interest and service to students of fire resistance.

The National Fire Protection Association, including fifty "underwriters' organizations and engineering bodies," is doing good work on similar lines on this Continent.

The reports of the Committee of Twenty of the National Board of Fireunderwriters are valuable documents, serving to show where danger exists, and how to combat it.

While it must be acknowledged that no drastic methods of reconstruction of "congested-centers" will be tolerated by a community at the present time, yet there is hope that, by calling especial attention to impending dangers, and, by submitting remedies at every favorable opportunity, much can be done to educate the people in the science of safeguarding their homes against destruction by conflagration.

The Smoke Plague and "Coalite"[1]

As it has been computed by expert authority that over 70 per cent. of the total smoke of metropolitan London is due to that from private chimneys, it follows that any special grate or other contrivance which eliminates the smoke element, will, pro rata, purify the London atmosphere. I understand that up to the present time no grate has been perfected, which as applied to a private chimney acts as an absolute smoke consumer, but tests which took place at the Crystal Palace in 1903 under the auspices of the Coal Smoke Abatement Society, enabled some inventors to exhibit grates in which the combustion is so nearly complete that the smoke emitted is practically imperceptible. The prize was awarded to the Tropican grate of Messrs. Chevasse and Kerr, of Birmingham, although others followed very close in order of merit as smoke consumers, the heating in each case being thoroughly effective and the economy great: as an instance of this, the firm I have quoted claim that their grate, which can be fitted at a cost of £5, burns 66 per cent. less fuel than the ordinary domestic grate.

[1]Extract from a paper in the *Westminster Review* by Mr. Charles Rolleston.

The economic problem of coal consumption is not only an individual, but a national question, and one having an importance by no means generally appreciated. The Royal Commission on our coal supplies have reported that of the 150,000,000 tons of coal annually used in Great Britain, 60,000,000 tons are burned to waste. This means simply that if the average price of coal of all kinds be computed at 16s. a ton, not a high estimate, the annual waste of money value in the British Isles would amount to the enormous sum of forty-eight millions sterling.

Let us now suppose, for illustration's sake, that the population of the British Isles paid an annual tax equal to this sum, and that the value in gold were by some chemical process to be reduced to a vapor which could never again be converted back to the original metal. Suppose also that this vapor, representing no earthly utility of any kind, should, in pollution of our atmosphere, produce the following evil results: physical degeneracy, tuberculosis, general low standard of health, erosion of public buildings, irreparable damage to priceless art works, injury to ornamentation and vegetation, ever-present discomfort and filth in home life, besides entailment of heavy and unnecessary expense. While regarding this formidable list of *preventable* evils, would not Englishmen of all classes consider that an annual outlay of forty-eight millions was a stupendous sum to pay for such a veritable box of Pandora, with its noisome swarm of poisonous influences incessantly issuing from it, and always so pernicious in their sinister flight over the land? Yet this is a tax which under another name Englishmen are paying, with the precise results which I have described.

At the same time, with a display of inconsistency almost incredible considering the national interests at stake, the Englishman grudges an increase of the estimates by a mere tenth of the amount in order to place his fleet in a position to defend his country better, and to maintain the integrity of his empire. It must be noted also that the foregoing calculation does not include deterioration of property amounting, as he has computed, to £5,000,000 in London alone, and a much larger but unknown amount throughout the large towns of Great Britain.

To summarize the question, the Englishman, clinging to certain antiquated methods subjects himself to disease, ill-health, destruction of property, waste of an enormous amount of wealth while living in a filthy, polluted atmosphere. Science, like a beneficent enchantress, offers him as an alternative, health, vitality, beauty of life, wealth, cleanliness, and comfort. The law empowers the Englishman to eliminate 30 per cent. of the evil influence, but the self-governing Englishman is too apathetic to enforce the law of his own making in the case of factory chimneys. Science offers the Englishman the opportunity of almost completely dissipating the remainder of the malign influence, while relieving himself of a great financial burden. Will he shut his eyes to the opportunity, and fail to take advantage of what would make his towns and cities, London especially, clean, beautiful and attractive? Viewing the serious nature of the coal-smoke question, the Englishman's attitude, so deficient in shrewd common-sense and mental alertness, will, if persisted in, exhibit an almost incredible instance of fatuous apathy and carelessness.

Within the last few months an invention has been completed which not only in its future beneficial effects on the health of the community, but as successfully solving a gigantic economic problem, bids fair to surpass any scientific application of the century. Mr. Thomas Parker, M.I.C.E., has for many years been recognized as an eminent scientist, owing to several important inventions of which he was the originator. For some time past this gentleman, observing the necessity of providing a fuel to take the place of the wasteful, crude, coal-consumption process hitherto employed, directed his attention to a possible substitute under the following conditions.

The fuel must be absolutely smokeless—*i.e.*, it must be of such a nature that it cannot emit smoke. The fuel must be capable of being readily lighted. It must be adapted for satisfactory consumption in an existing grate, stove or kitchen range. It must provide a bright, cheerful fire, to which, from long custom, Englishmen are so partial. It must not emit unhealthy or unpleasant fumes. It must be as convenient and relatively as cheap as the fuel at present used. As a result, Mr. Parker has achieved a success in his investigations which probably far exceeds his own original expectations. That result is the production of the composition entitled "Coalite," by a chemical process applicable to ordinary coal, and eliminating from it those noxious elements which in combustion pollute the atmosphere. By ensuring perfect combustion, Coalite gives a smokeless fuel.

Coalite is now being produced at a retail price of 25s. a ton. It is claimed for it that on being tested, it is shown to radiate 2½ times the heat of ordinary household coal. Even supposing that only double the amount of heat were generated by coalite, it would then have to the householder an economic value, merely as a heat producer, of 12s. 6d. a ton, assuming the best coal to be used at 25s. a ton. Perhaps, however, the average quality of coal in London may be valued at 18s. 6d. a ton, and at this rate the ordinary householder will save 9s. 3d. a ton; no small reduction from the fuel bill each year.

Should coalite be used with the Tropican grate before-mentioned, and in this case should it be possible to save the 66 per cent. of fuel which the inventors claim that it does in the case of ordinary coal, a further and very large proportionate reduction of the combustible will follow. The advantages of Coalite are so obvious that if it can be produced on a commercial scale, little doubt can exist as to its speedily coming into general use, thus solving one of the greatest economic and health problems of the century.

COMMUNICATION

HOW CERTAIN COLUMNS WERE PROTECTED FROM RUST.

To the Editors of the American Architect:

Dear Sirs:—Much ado, and not without good reason, is made anent the havoc played by rust with steel structural work. I have read and been told much by architects of the difficulty they had in properly protecting the steelwork, particularly cover-plate zee-bar columns. It is supposedly almost an impossibility to get the insides of these properly coated when once they are in place. Some very high and mighty authorities claim that these enclosed spaces being virtually airtight, it mattered little about getting more than the shop-coat of paint in them. Others again, and with justice, I believe, contend that injurious rust is as possible and certain inside of those columns as it is outside, if every particle be not protected.

A little experiment, made some years ago, may be of advantage to some of the brethren who have such columns about which they may be in doubt. On the Chicago Postoffice Building some portions of the steel frame were much ahead of the rest of the work, and, besides, there were other delays in construction, so that parts of the steel frame stood for months exposed to the weather. The steel man averred, by all that was holy, that the tops of the columns were well covered and that the steel was properly painted inside and out. Inspectors confirmed this, but nevertheless I had my doubts and insisted upon tapping some of the columns. In the very first one so punctured there were three pailfuls of water, in spite of the most effective cover that was supposed to be there! It was, therefore, "up to us" to drain every column properly, and to make sure that the columns, interior as well as exterior, were amply protected. A simple and cheap expedient was resorted to. We punched a hole at the top and one at the bottom of every column; corked up the bottom one and ran asphaltic paint into the hole at the top. As the barrel was placed a story or so above the head of each column, there was pressure enough to cause the paint to ooze out of the slightest interstice that the rivets had not closed up, and it was therefore absolutely sure that every particle of the steel was properly coated. After letting it stand for awhile we would draw the cork at the bottom and run the surplus paint off, and then repeat the dose on the next column.

I can swear that every one of those columns is thoroughly protected internally. Externally they were painted again, and well cemented over with good cement, all the voids filled with concrete of broken brick and tile, and the whole enclosed in most carefully-bonded tile fireproofing, so that I am as confident that none of the structural members can ever be affected by fire as I am that æons of time will elapse before rust can attack and damage any of that steelwork. F. W. Fitzpatrick.

ILLUSTRATIONS

HOUSE OF MR. J. B. FORD, JR., 1730 JEFFERSON AVENUE, DETROIT, MICH. MR. ALPHEUS W. CHITTENDEN, ARCHITECT, DETROIT, MICH.

GARDEN FRONT OF RESIDENCE, SEWICKLEY, PA.

We have not been able to ascertain any facts connected with this building, which we understand to be an old one remodelled,

and publish the views as showing a particularly successful piece of revamping.

ITALIAN TOMBS—FIVE PLATES.

For description, see article elsewhere in this issue and also further plates in the issue for September 14.

HOUSE OF MRS. HARRISON GARDNER, 50 AMORY STREET, BROOKLINE, MASS. MR. W. G. RANTOUL, ARCHITECT, BOSTON, MASS.

A HOUSE AT INDIANAPOLIS, IND. MESSRS. SPENCER & POWERS, ARCHITECTS, CHICAGO, ILL.

Additional Illustrations in the International Edition.

STREET FRONT OF RESIDENCE, SEWICKLEY, PA.

STREET DOORWAY OF THE SAME.

NOTES AND CLIPPINGS

THE RESPONSIBILITY OF ARCHITECTS.—A case was heard last week at the West Hartlepool County Court which suggests that the responsibility of architects has ceased to be nominal. Mr. James Garry, architect, of that town, claimed 31*l.* balance of his commission for services in connection with the erection of a house. A counterclaim amounting to 99*l.* for alleged negligence was put in by the defendant, a medical doctor. The architect's claim was admitted; the counterclaim was for loss arising from the introduction of a beam which was not of sufficient strength, and which failed to support the wall above it. The judge said he believed the building owner had sustained damage due to want of that proper supervision which he had a right to look for from the professional gentleman engaged. After considering each item, his Honor gave judgment for 28*l.* 17*s.* 5*d.* on the counterclaim. The architect declared he visited the building at least twenty times, and no sign of any defect in the beam was apparent until after the final certificate was granted. The decision is important because the architect's responsibility has been supposed to come to an end with the completion of the builder's contract.—*The Architect.*

HAVRE.—In many of the guide-books to France, as well as in encyclopædias, the original name of Havre is said to be "Le Havre de Notre-Dame de Grace," and it was derived from a small chapel which stood on the site of the town of which Francis I. was the founder. The British Consul-General, Mr. Hearn, gives a different interpretation of the title, and one which archæologists will consider more prosaic. He says the flat, low-lying marshy land which was left by the Seine was known in the fourteenth century as the "Plaine de Grasse." The name was derived from the Low Latin word "*grassus*," which signifies mouth, estuary, port or place where vessels can touch the low-lying land—land often inundated and always marshy—a creek or bight and narrow passage leading thereto from the sea. Thus the Haven of Grace actually takes its name from those features of the land which have been both an advantage and a disadvantage in its progress. The advantages lay in the creeks and fosses which have now become basins and docks, while the obstacles have made themselves apparent in the difficulty and expense in laying foundations in such fickle ground, and this has been particularly the case in building the great half-tide dock of the new harbor works. It is worth remarking that, according to some French authorities, Francis I. wished to have the new port known as "Franciscopolis," but the name of the old chapel was too closely associated with the place to be superseded even by a royal command.—*The Architect.*

LA PLATA A MODEL CITY.—It is not often that a city is built to order. One great capital, indeed, St. Petersburg, was built at the nearest point to the sea then available in Russia, laid out on a definite plan, and completed in spite of great difficulties of site and climate; but this was two centuries ago. It is fifty years since a large part of Paris was transformed and renovated, but the rebuilding, after all, was partial, and the visitor who wanders a little way from the great new thoroughfares finds far more that, if not exactly ancient, is fairly old than is generally imagined. In our own time a city has arisen in South America which is entirely a political creation. This is the city of La Plata. When, after long differences and civil wars, Buenos Ayres became the capital of Argentina, it ceased to be the seat of government of the Province of Buenos Ayres; for this a chief town was required, and a new city was created at a distance of thirty-five miles from the national capital. In a country where millions of European (and especially English) money is pouring in, and thousands of European emigrants arriving every year, no difficulty was experienced in obtaining funds or labor, and the new city arose with extraordinary rapidity, now numbering 70,000 inhabitants. And it is no collection of shanties, of log-huts, or corrugated iron; it is constructed of masonry of extraordinary massiveness. The public buildings are in the style of the Italian Renaissance, with occasional detail borrowed from Spain, and they are on a scale which indicates a firm belief that La Plata has a future. Unquestionably the city is a success, and it suggests similar experiments nearer home in countries with a rapidly increasing population, and confronted with the many urgent questions arising from it. La Plata, at least, proves that such projects are not wholly Utopian.—*The Builders' Journal.*

SOME SCOTCH ARCHITECTS AND THEIR WORK.—The employment of Scotch architects for buildings in England has by no means been exceptional, and at the present moment Mr. J. J. Burnet, of Glasgow, is doing the extensions to the British Museum. James Gibbs came from Aberdeen and designed St. Martin's-in-the-Fields and the Bodleian Library. The Brothers Adam built the Adelphi; J. M. Brydon, whose Government offices in Westminster are now being finished; and Sir Wm. Chambers, to whom London is indebted for Somerset House, were all Scotsmen. So was William Young, who designed the new War Office.—*Building News.*

NEW SUMMER PALACE FOR THE SPANISH KING.—At the time when the King of Spain married an English princess there were rumors that a British syndicate had bought the picturesque island of Cortegade in order to build on it two palaces, one for Edward VII., the other for Alfonso. In reality, the island has been bought for the Spanish King alone, and given to him as a present by the Galician communities of Villagarcia, Carril, Villapian, Cambadoes, Fifiñanes, and Santo Tomé—communities which have often profited greatly by the presence of the English fleet in Spanish waters during maneuvering time. The island, Cortegade, situated in Arosa Bay, is densely wooded and mountainous. It has been inhabited hitherto by eighteen families of about 100 individuals, all of whom will leave, having received proper compensation. The only condition they made was that the chapel of the Encarnacion, on the highest point of the island, be left intact. The island is to be connected with the mainland by a bridge about 100 meters long. The King is much pleased with the present and intends to build within the next three years a palace which will cost about 10,000,000 pesetas, and the plans for which have already been sketched by the court architect, Señor Ripollés. The cornerstone is to be laid this month.—*New York Evening Post.*

THROWING A HIGH CHIMNEY.—The chimney-stack at Par, near St. Austell, the largest in the west of England, was successfully thrown on Friday by William Larkins, the chimney expert. The chimney was 260 feet high, and was composed of a million and a half of bricks. It is calculated that the structure weighed 3,000 tons. The stack had been in existence for forty-four years, and had not been used for twenty-five years. It was originally used for smelting silver lead. Larkins thinned the base of the walls to the extent of a brick and a half, and then cut half way round to a depth of 3 feet. The stack adjoined the main road, and its fall was watched by thousands of people.—*Building News.*

AN ANTI-ELECTROLYTIC JOINT.—An insulating joint to prevent electrolysis has been used in the 6-inch water-service pipe that enters the power-station of the Cleveland Electric Railway. It consists of a large wooden washer bolted between special castings forming adjoining ends of the service. Each casting has an 11-inch flange with eight ¾-inch holes, by which it is attached to the service pipe, and 13½-inch flange with a dished face and eight 1⅛-inch holes to form the insulating joint. The wooden washer is a piece of hard maple boiled in paraffin, and having a ¼-inch boss on each side, which fits into the recess in the face of the flange of the casting. The bolts at the joint pass through rubber hose, and their nuts press on large fibre washers.—*Building News.*

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Palisades Trust and Guaranty Company's Building, Englewood, N. J.—Synagogue of the First Hungarian Congregation, West 116th St., New York, N. Y.—House of Mr. Holt, Detroit, Mich.—House of Douglas Steward, Esq., Pittsburgh, Pa.
Additional: Entrance Porch: Building of the Palisades Trust and Guaranty Company, Englewood, N. J.—Entrance Doorway: Synagogue of the First Hungarian Congregation, West 116th St., New York, N. Y.

MEMBERS of the American Institute of Architects will do well to turn over their desk-calendars and jot down the memorandum that the forty-first annual convention of that body is to be held in Chicago, November 18-20 next, in the Art Institute. The programme in full is not yet prepared, but it has been decided that, as nothing of an ornamental nature can be scheduled, the leading papers and most important discussion shall be devoted to the consideration of reinforced-concrete construction.

AT intervals during the course of a good many years we placed before our readers the facts relating to the complex but interesting history of the court-house and city-hall building at Toronto, and we believed that, long ago, the last interesting incident had been chronicled; but seemingly this was a mistaken belief. It seems now very much as if the architect of the building, Mr. E. J. Lennox, had become envious of the reputation of the architect of the Pennsylvania Capitol and his $525,000 fee, and wished to show what a Canadian architect could do in the fee line, for it is reported that he has just put in his final account, which foots up the very respectable total of $242,870.22, of which he has received $61,000 on account, and as this account is itemized to the extent of seven type-written pages, it is obvious that the matter is a serious one to him and to the city, and is being looked after with all particularity.

AS it is a matter of somewhat ancient history, it is worth while to run over the main incidents of the intricate story. Early in the eighties the need of a new court-house was perceived, and in 1884 a competition was held to secure a design for a structure that could be built for $200,000, a public competition which drew out a good many designs from both sides of the line. The expert-adviser made a report that included the statement that not one of the designs in any way worthy of execution could be erected within the appropriation. Hereupon the city decided that the competition was so much of a failure that it refused to pay any of the premiums promised. We are somewhat hazy as to the next steps, and cannot recall whether there was another competition, but we believe there was not; nor do we know just when it was decided to build a combined city-hall and court-house. But we find that in 1888 a city which would not consider the advisability of building a court-house that would cost more than $200,000 had already saddled itself with contracts and estimates for a building which, even then, promised to cost a million and a half. After the corner-stone was laid in 1891, matters dallied along, as a big building operation must where winters are cold and long, with constantly growing friction between the architect and Neelon, the contractor. At length, in 1894, before the building was above grade, the architect dismissed the contractor. But the contractor refused to go, asserting that he could be dismissed only by the building-committee of the Board of Aldermen. The fact was, however, there was no such committee; the enabling act empowered the Aldermen to appoint such a committee, but in their wisdom they had decided that the architect could get along well enough without its aid.

THE architect, thus confronted, secured the aid and countenance of a squad of policemen, and after midnight, one day, they scaled the hoarding about the premises, expelled the contractor's watchmen and retained possession. But Neelon was not only a good fighter, but wealthy, and for years he carried on a succession of suits against the architect and the city, and we do not know that the last of them is disposed of, though one court after another ruled that the architect had competent authority and full justification for the dismissal. As Mr. Lennox found the work all at sixes and sevens, he decided to get it into shape before seeking a new contractor, and so carried on the work by day's labor until it had been leveled up to a fresh level and a fair starting-point. Then new bids were called for and received, but when it came to be a matter of signing a contract the lowest bidder refused to accept the work and the same decision was reached by the next-lowest bidder. All this time the labor-unions, who had had their appetites whetted, were clamoring to have the building carried on by day's labor, and the architect, who practically received no moral support from the authorities, decided there was nothing to do but to adopt the rôle of contractor and go on with day's labor, and in this way, we believe, the court-house and city-hall was built, the city finding itself obliged to provide more and more

money, just as did Philadelphia in the case of its Public Buildings, if it did not desire to be left with an unusable ruin on its hands. Our story is incomplete, for we do not know the final cost of the building, though, as the architect's bill is said to about 9½ per cent. of the cost, an outlay of two and three-quarter millions is indicated.

IT is plain, however, that the architect had to cope with very unusual conditions and accept very unprofessional responsibilities, and it is not at all certain that he may not justly be entitled to a contractor's profit as well as to an architect's fee. At any rate, the story will show how it was possible for an architect to itemize his account to the extent of seven pages. These items covered preparation for a court-house only; for the building actually built; for a library that might have been built in conjunction with it, but was not; for measuring the old building; for preparing pamphlets and reports; for all the extra work and alterations inevitable in a work proceeding not under contract, and for this, that, and the other thing that an architect is called on to spend time and effort over. For presenting his account now, some nine years after the completion of the building, the architect apologizes, explaining that there has been much delay in closing all the accounts! But fancy the feelings of the heirs of City Fathers who once hesitated to spend $200,000 on a court-house when they find that their architect's commission foots up $242,870.22!

WHEN Mayor Fitzgerald, of Boston, appointed the commission that has just completed a revision of the building-law for that city, he expressed to them his wish that they should revise the law so that it would "encourage, not discourage, building-operations" in the city. His instruction, though laudable in itself, might have had lamentable results if the commissioners had chanced to be mere political henchmen, quite ready to "let down the bars" and lower the standard of acceptable building methods; but fortunately they were men who could be trusted to do their work in a thoroughly reasonable, if not theoretically the most exacting, manner. How far the new law will encourage building remains to be seen. In speaking of this new law the other day, an architect expressed the hope that some competent person might soon take up the underwriters' building-code and pull it to pieces, for he was convinced that its extremely exacting requirements tended directly to the discouragement of building-operations, and that, of course, had an effect on the income of architects. His feeling was not that the municipal building-laws and the underwriters code were any stricter than they really ought to be, but rather that they were "impossible," being altogether too idealistic, and, moreover, were evaded as often as possible by contractors, owners and possibly architects.

NOW, a good law that is evaded is no better than a poor one that is obeyed; yet few will be found who will argue that the law that compels the erection of the most indestructible of fireproof buildings is not in the long run the best law for a community. But we have to deal with men and conditions as they are, and it is rankly unfair to subject a few men to grinding conditions *for the sake of other people,* conditions from which those same other people are exempted. The theory of the law and the principles of policing make it incumbent on the authorities to treat all men with equal fairness, but the man who invests in building under the present laws is not treated by the public authorities, or by the underwriters, with such fairness. The city compels him to erect a fireproof building, not for his own sake, but for the purpose of providing a safeguard to the property of his neighbors—whose property, by the way, may be a menace to the safety of the costly building the law compels him to erect. Further, like his neighbors, he is taxed for the maintenance of an expensive fire-department, a high-level water-supply and other protective appliances, for whose aid he has no further use! There can be no question, then, but that one who builds a first-class building nowadays is discriminated against unfairly, for the public authorities constructively put their hands into the pocket of such private individual and apply its contents to the erection of fire-breaks for the public good, which, though unquestionably desirable, should be erected at public cost.

THAT is the marrow of the whole fireproof matter, the essence and purpose of all building-laws, and a cure should be sought for the inequities of the situation. There are at least two ways in which an honest community can set this matter straight. First, the public exchequer can be drawn on in each case to meet the excess of cost of fireproof over combustible building—an undesirable course, since it would tend to set up a partnership in real-estate titles between the public and private owners. Or, secondly, the taxes upon fireproof buildings erected under the exactions of ideal building-laws can be abated until such abatement equals the difference in cost between fireproof and combustible structures having the same external effect and internal accommodation. This solution we have recommended before, and doubtless shall again, for it really is not fair to compel one man to spend his good money for the protection of his neighbor's property, and yet make him no return or acknowledgment.

HAVING, a short time ago, to consult the map of Paris, we were rather surprised not to find the Rue d'Enfer at the point where memory asserted it should be found. We now discover that, though there has been no political revolution of late, such as is ordinarily a cause for changing many street-names in Paris, some waggish body has caused the respectable though sulphurous title to be changed to Rue Denfer-Rochereau. This punning with place-names, which has a certain analogy with the ideographic symbolizations adopted by inns and tradesmen's shops in France, seems to be catching, for recently the city of Lyons, finding it necessary, desirable or convenient to displace with new ones some three hundred of its well worn street-names, has indulged in a similar vein of wit. Thus, amongst other changes, the Rue de Saint Georges becomes the Rue Georges Sand, Sainte Anne becomes the Rue Jeanne Hachette, while the Rue du Moulin becomes the Rue Don Quichotte.

"The Final Report" on the San Francisco Disaster[1]—IV

IN further discussion of the "Final Report" on the San Francisco disaster, the August issue of the *Proceedings* of the American Society of Civil Engineers contains this:

A. L. A. HIMMELWRIGHT, M. AM. SOC. C. E. (by letter).—The report of the Committee on Fire and Earthquake Damage to Buildings was eagerly awaited by all who have to do with the construction of modern buildings.

The span of human life is short, and a disaster such as that which occurred in San Francisco will probably not be repeated in another century. The lessons which it taught, and especially the effect on fireproof buildings, are of such vast importance that a critical, careful and detailed investigation and report would have been a valuable contribution to our knowledge of building construction. It is to be regretted that all the photographs taken and collected by the Committee could not have been printed with the report, because such illustrations are frequently more satisfactory than verbal descriptions. It is also unfortunate that the Committee's report is so brief that, in many cases, it is necessary to indulge in general statements, which are entirely too broad, and to that extent are misleading. A detailed report which would have embraced twenty times the space taken by the Committee would have been welcomed gladly by the architectural and engineering professions.

In the design and construction of buildings of the better class, which are now made as nearly fireproof as possible, architects and engineers are searching constantly for those materials and methods which will show the best efficiency and fulfill the purpose for which they are intended. Definite and exact information on this subject is what is desired particularly. The behavior of any given material under varying conditions, or of the same material used in different ways, would supply information of the kind sought. The fact that all materials are damaged more or less when exposed to intense heat does not interest the designer; but the fact that one material proved more efficient than another, under the same conditions, is valuable information. Instead of collecting information of this character, the Committee seems to have made an effort to generalize and classify results, which practically nullifies the usefulness of the report.

There are in the report a few statements of facts which are somewhat at variance with the writer's observations. On page 322[2] a statement is made that the Bush Street front of the Mills Building leaned toward the street from 7 to 9 inches. Careful determination, made under the writer's direction, in the latter part of May, 1906, showed that this front leaned out toward the street only from 4 to 5 inches.

The very severe condemnation of the masonry-walled structures without steel frames is a little unwarranted. Where the walls were tied together and the masonwork was executed with goc Portland cement mortar, neither the earthquake nor the fire caused any serious damage. The Palace Hotel and the Parrott Estate Building, at the northwest corner of California and Montgomery Streets, are two noteworthy examples of brick and stone masonry without interior steel frames which stood the test with very little structural damage.

The writer takes decided issue with the Committee on the general statement, on page 329, that "all materials were destroyed when directly exposed to the fire for any length of time." While it is admitted, by those thoroughly informed on this subject, that the different building materials have varying relative values from a fire-resisting standpoint, it is now an established fact that there are materials capable of resisting, in a thoroughly satisfactory manner and with inappreciable damage to the material itself, any exposure of flames and heat which are likely to occur in any large conflagration. This is an important fact which should have been defined clearly in the report.

In considering the subject of the material for fireproof floors, only two kinds are mentioned—namely, terra-cotta and concrete—and the statement is correctly made that, of these two materials, "terra-cotta suffered the more"; also that "in all cases the record of concrete is better than that of tile." No distinction, however, is made between different kinds of concrete and tile and different forms in which they are used. There is a vast difference in the fire-resisting qualities of concrete made from different aggregates, and in the case of the same aggregates used in different ways. There is also a difference in the fire-resisting qualities of hollow-tile blocks.

The writer has made an extended study of the fire-resisting qualities of different materials used for fire-proofing purposes, not only in San Francisco and Baltimore, but also by full-sized, practical fire and water tests which have been made at different times under his direction. It is well known that stone concrete, whether the aggregate be of granite, sandstone, limestone or trap-rock, suffers from dehydration when exposed to heat, and for that reason is less desirable as a fire-proofing material that concrete made from aggregates which do not contain "water of crystallization." It has been demonstrated that stone concrete, when exposed to a temperature of from 1,800° to 2,000° Fahr. for a period of four hours, will be affected by dehydration to a depth of from 3 to 4 inches, and the strength of the concrete will be seriously impaired to that depth. When the concrete has been damaged by dehydration, the aggregates break and disintegrate, and the bond between the aggregates and the cementing material is lost, so that an ordinary fire-stream, under 60 pounds pressure, will easily abrade the under surface and wash it away. If the concrete is allowed to cool after being heated, and without the application of water, the dehydrated surfaces can be picked apart by the fingers or easily removed with a small tack-hammer, to the depth to which dehydration has taken place. All natural rock contains moisture, and for that reason concrete made from any variety of stone aggregates will be dehydrated when subjected to heat, and consequently is unsuited and poorly adapted for use as a fire-proofing material in any position where it is likely to be subjected to high temperatures.

The fundamental principle in a concrete for fireproofing purposes is the use of aggregates which do not contain moisture, but which, when made into concrete, possess sufficient strength to fulfill the requirements. Steam-boiler cinders, crushed furnace slag, crushed brick and "tetzlonti" (a light, porous, lava rock occurring in the vicinity of the City of Mexico) are the materials best suited for fire-resisting concrete which have been found to be commercially available. Concrete made from these materials, with very little ramming, to secure lightness and porosity, has been shown to possess excellent and satisfactory fire-resisting qualities.

Another important feature of a concrete which is to resist heat is the presence of voids. A "full concrete." in which the voids are filled solidly with cementing material, is desirable from the standpoint of strength, but this feature detracts very largely from its fire-resisting qualities. The ordinary requirements for strength in building construction, where these materials are used for fire-proofing purposes, are amply fulfilled by a concrete which possesses a large percentage of voids, so that their presence is a decided advantage in ordinary fireproof floor construction.

The different forms and the principles involved in the construction of concrete floors have also an important bearing on the efficiency and fire-resisting qualities of the different methods. In all recent large conflagrations the segmental arch, in which all the material is used in compression, and in which the strength is independent of light metal elements, proved to be in a class by itself, and developed fire-resisting qualities and strength vastly superior to any of the flat-slab methods in which light steel reinforcing elements were used in tension.

In all the flat-slab methods in which steel tensile elements are used the economical position of the reinforcing metal is invariably near the under surface of the slab, and as far away as possible from the neutral axis. When located in this position, the nearer it is to the under surface of the slab the more it is exposed to the effect of the heat when attacked by fire; and, when thus exposed, the reinforcing metal has very little value as a load-sustaining portion of the construction.

When the reinforcing metal is covered with one inch of stone concrete, which is the maximum thickness of covering usually provided, experiments show that the metal is heated to a temperature of about 800° Fahr. in about one hour, and to 1,300° in from three to four hours, when subjected to a uniform temperature of 1,800° Fahr. At 800° Fahr. reinforcing steel loses approximately 26 per cent. of its strength, and at 1,300° its strength is practically nil.

The flat-slab methods in which steel is used in tension are, for the above reasons, vastly inferior for horizontal-load sustaining

[1]Continued from page 219, No. 1640.
[2]Proceedings, Am. Soc. C. E., March, 1907.

construction to the segmental-arch methods. In wall and partition work the use of metal reinforcement near the center of the section is much less objectionable, as the metal elements act largely as stiffening and bracing members, and the slab, being in a vertical plane, sustains its own weight and is, therefore, less likely to be deflected and damaged when subjected to heat.

The most elaborate and instructive fire and water tests ever made were conducted by the New York Building Department in 1896 and 1897, under the direction of Mr. Gus C. Henning. These tests were made scientifically, and are on record in the Department. A brief résumé of these tests will be interesting in connection with this discussion. On December 23, 1896, a stone-concrete, flat-slab, floor section, 11 by 15 feet, was tested by fire and water. The concrete floor was supported by two steel beams at about 4-foot centres. The reinforcing metal consisted of bars at 16-inch centres, the under side of the bar being about ⅝ inch from the under surface of the concrete floor slab; the section of the bar was ¼ inch by 2 inches, the 2-inch dimension being vertical. The concrete was mixed in the proportion of 1 barrel of Dyckerhoff Portland cement, 2½ barrels of sand and 5 barrels of small broken blue stone passing a sieve of 1-inch mesh, with 12.8 per cent. of water in bulk. Rock wall plaster, mixed in the proportions prescribed by the manufacturers, was then applied to the under side of the flooring to a depth of about ¾ inch. A second coat of this plaster was applied later, making the total thickness of the plaster from ½ to ⅝ inch. A white finish was then applied in the usual manner, representing the usual conditions in finished buildings. This floor formed the roof of the test structure built for the purpose, and was located about 10 feet above a grate, of the same area as the floor, on which a hardwood fire was maintained to produce the temperatures. The fire was started at 10.30 A.M., and the following temperatures (as recorded by a Uhling and Steinbart pyrometer) were produced at the times set opposite:

Time.	Temperature, in degrees, Fahrenheit.	Time.	Temperature, in degrees, Fahrenheit.
11.13 a.m.	1,775	2.00 p.m.	1,950
11.30 "	1,850	2.40 "	2,100
12.00 m.	2,050	3.00 "	2,200
12.30 p.m.	2,000	3.30 "	2,100
1.12 "	2,100		

At 3.30 P.M., while the ceiling was observed to be in a red-hot condition, water at a pressure of 60 pounds was applied to it with a fire-hose having a regular 1⅛-inch nozzle. Some of the plaster had fallen away previously, and the remainder was washed away by the water. The fire-stream also abraded the entire under surface of the stone-concrete flooring to a depth of 1¾ inches, wherever the water struck it, exposing all the reinforcing bars to an average of about one-half their depth.

The abrasion of the concrete to the depth stated was due, no doubt, primarily, to dehydration of the stone, and secondly to rupture and disintegration caused by the sudden cooling while highly heated, on the application of the fire-stream.

A similar fire and water test was made on a flat-slab, cinder-concrete floor on April 23, 1907. The concrete consisted of 1 barrel of Atlas Portland cement, 2 barrels of clean, sharp sand, and 4 barrels of steam-boiler cinders. The reinforcement consisted of 2½ by 6-inch mesh expanded metal of No. 10 gauge. This was laid directly on the centering, and the concrete was deposited over it to a depth of 4 inches. The plaster was King's Windsor cement, applied in accordance with the manufacturers' specifications, in two coats, to a total thickness of about ½ inch, approximating to the same condition as in the test previously mentioned. The fire test was started at 10.05 A.M., and at the following times the corresponding temperatures were obtained:

Time.	Temperature, in degrees, Fahrenheit.	Time.	Temperature, in degrees. Fahrenheit.
10.52 a.m.	1,800	1.12 p.m.	2,000
11.30 "	2,200	1.40 "	2,100
11.58 "	1,900	2.30 "	2,050
12.06 p.m.	2,100		

At 3.05 P.M., water, at a pressure of 60 pounds, was applied to the ceiling with a fire-hose having a regular 1⅛-inch nozzle, while the under side of the flooring was observed to be in a red-hot condition. Wherever the water struck the ceiling the plaster was washed off, but only a very small quantity of the cinder concrete was abraded, barely enough to loosen in spots the expanded metal fabric, the under side of which was flush with the bottom of the slab.

A similar test was made of a segmental, cinder-concrete arch on October 28, 1906. The concrete was mixed in the proportions of 1 part Aalborg (Danish) Portland cement, 2 parts clean, sharp sand, 5 parts steam-boiler cinders, without screening or washing, and as taken from the chutes of the New York Steam Company, and 1.35 parts water. This concrete was laid on a permanent wire centering consisting of No. 19, four-warp, two filling wire-cloth, stiffened by 7-16-inch round steel rods woven in at intervals of 9 inches, segmental in form, providing for a thickness of about 3½ inches at the crown of the arch, the concrete being placed in position without ramming and by simply patting and smoothing the top surface with shovels. The plastering consisted of ordinary lime mortar furnished by the United States Mortar Supply Company, of New York City, and the two coats aggregated ⅝ inch in thickness. One entire bay, or one-third of the under side of the floor area, was left unplastered so as to expose the concrete to the direct action of the flames. The fire test was started at 10.06 A.M., and the following temperatures were obtained at the times set opposite:

Time.	Temperature, in degrees, Fahrenheit.	Time.	Temperature, in degrees. Fahrenheit.
11.14 a.m.	1,700	1.06 p.m.	2,100
11.35 "	1,900	1.45 "	2,050
11.55 "	2,050	1.57 "	2,125
12.16 p.m.	2,000	2.18 "	2,130
12.30 "	2,150	2.55 "	1,950
12.43 "	2,300		

At 3.06 P.M., water, at a pressure of 60 pounds, was applied to the ceiling with a fire-hose having a 1⅛-inch nozzle, while the under side of the flooring was observed to be in a red-hot condition. The following is quoted from records of the Building Department:

"Close examination of the concrete showed that the wire netting had been completely burned off in the naked arch. The concrete arch (unplastered) seemed not affected in any way by the fire or water except small spots washed away where water struck with great force."

The spots referred to were not more than ¼ inch in depth, and did not aggregate more than 3 square feet of the entire surface.

Several months after this test was made, two 2-inch cubes, made from the concrete which had passed through this test, were tested for strength, and developed a crushing strength of 940 pounds per square inch, which shows about the same strength as a similar normal concrete of the same age, and indicates therefore that, with the exception of a very thin layer of the actual surface of contact with the flames, the concrete was uninjured by the test.

Approximately 1½ hours were required in all these tests to develop a temperature of 2,000° Fahr. This minimum temperature, with a maximum temperature running up to 2,500° Fahr., was maintained for about 3½ hours longer before the application of water.

In the special structures used for these tests, the walls were of brick, 13 inches in thickness, with four flues at each corner. The intake openings below the grate were sufficiently large to induce the necessary draft, and this was regulated by sheet-iron dampers. To produce and maintain the temperatures recorded, an average of about 7 cords of hardwood fuel was consumed, representing a total average depth of approximately 5½ feet over the entire grate area.

In the average office and hotel building, the combustible contents, which would be consumed in the case of a conflagration, consists of the wood finish, the furniture and the furnishings. If these were all removed and placed in a layer of uniform thickness over the floor area, there would seldom be an average depth of more than 6 or 8 inches; or, approximately, one-tenth of the quantity of fuel consumed in the New York Building Department tests. The intensity of the heat and the duration of the fire in the interior of fireproof buildings depend upon the conditions of draught and the quantity and character of the fuel or combustible contents. In the San Francisco hotels and office-buildings the average duration of the fire in any one room seldom exceeded 20 or 30 minutes. In special cases, as in supply and storage rooms, the duration of the fire was longer, but the conditions of draught in rooms of that kind were generally such that the fire smouldered and did not burn with as intense a heat. The average maximum temperatures attained in these buildings, as determined by the fusing of metals and other phenomena, ranged from 1,500 to 1,900° Fahr. In certain spots where there happened to be more than the average quantity of fuel, and the conditions of draught were favorable, temperatures up to 2,100 and 2,200° Fahr. were sometimes reached. These maximum temperatures, however, were not maintained for more than a few minutes in each case.

From the foregoing observations, and on account of the total quantity of fuel that it was possible to consume, it should be ap-

recognizable, but, as it will be seen from the next paragraph in our correspondent's letter, this is not the position occupied by one of these consulting architects in America, who is instanced as typical of the new profession. The paragraph runs as follows:

"Referring to this newly-established branch of our profession, one's mind naturally turns to its most successful practitioner here, ... who seems to have been the pioneer and the one who has carried that practice to the highest perfection. He has associated himself with the leading specialists in all the lines subordinated to or included in the general term Architecture. Among these gentlemen are structural engineers, experts in fire-proofing, in sanitation, in lighting, landscape gardening, decorative work, and even barristers and counsellors of high repute, who take care of contracts, property rights, and the legal phases of building. So equipped, this 'consulting architect' is ready to handle any problem that may be presented to him. Besides these regular associates, he is in closest touch with specialists of all kinds, men accustomed to certain lines of factory buildings, breweries, railway shops, etc., in addition to which his own experience is necessarily of the widest."

This American architect, who thus advises upon specialist work, cannot be a master of all trades, and he has, as is frankly admitted, to call in the assistance of real specialists. He thus acts as merely an employment agent, and his concern is very little different from a domestic servants' registry-office. This surely is not the function of a consulting architect. Our correspondent would ingeniously wish to convey the idea that the consulting architect is somewhat in the position of consulting physician or surgeon, being called in by the general practitioner when the latter feels that something has been confided to him that is out of the regular course of his experience, but the difference is that the consulting physician or surgeon does not claim to know all about everything, merely claiming to be a specialist in one or two directions. The ordinary practising architect does not require a consulting architect; he requires a specialist. The American "consulting architect" simply farms out the work again. In dealing with commercial buildings of a large size we can fully appreciate the advantage of engaging one firm, having numerous specialists in its own employ, to undertake the whole of the architectural work, and the modern American firm of architects has as its basis a perfectly legitimate principle, but the crux of the question lies in the fact that architecture requires an artist, and the responsibility for the artistic treatment should be acknowledged publicly. The American "consulting architect" is, in the majority of cases, no better than the English "ghost," because his position is not so open that the public may understand that such co-operation has been afforded to the architect whose name appears as entirely and solely responsible.

Palimpsest Brasses

A NOTABLE result of the vandalism of the Reformation was the palimpsest brass, as it has been called—a term which by long usage must be regarded as established. The palimpsest brass is two-fold in character. It may be one having a more recent figure or inscription engraved on the reverse side of the original. Sometimes the brass may be composed of one or more pieces coming, perchance, from different places; or, again, it may be a brass the original design of which has been altered to suit the requirements of a later date. Examples of this practice are naturally rare, for it is obvious that not only is such a change difficult, but that it was one which would scarcely be appreciated by any person who desired to commemorate a relative in a seemly manner. A modification of this practice is the addition of a new inscription or shield to the original figure. A curious example of the second class of palimpsest may be seen in a brass at Okeover, Staffordshire. Originally laid down to the memory of William, Fifth Lord Zouch, of Harringworth, and his two wives, about the year 1447, soon after the death of his first wife, Alice Seymour, it became, probably as spoil from some monastic house, the memorial of Humphrey Oker, who died in 1538, his wife Isabel and their children. Little alteration was really made in the brass, except in the figure of Lord Zouch, where portions of the body armour were cut away and a tabard, charged with the Oker arms, made in the indent thus created. The upper part of the helmet, with its crest, was removed and the crest of Oker substituted. The lady on the dexter side remained unaltered and passed as Isabel Oker; but the second lady was superfluous, so her figure was reversed and thereon were engraved the Oker children in three rows, the head and shoulder of the figure being filled up with an oak tree bearing a shield. The original shields and marginal inscriptions were simply turned over and re-engraved.

But in by far the larger number of instances the palimpsest is formed by the utilization of the blank side. An interesting and striking example is a memorial at Hedgerley, Bucks. Here there is a brass with the effigy of Margaret Bulstrode, 1540, a foot inscription, a mutilated shield, and a group of children, all of which are palimpsests and seem to be made up of spoil from the great abbey at Bury St. Edmund's. The figure of the lady is cut out of an inscription in English verse, which is only partly legible, and on the back of her own inscription is another to Thomas Totyngton, Abbot of Bury, who died in 1312:

"Totyngton Thomas Edmundi qui fuit abbas
Hic iacet esto pia duct'r u'go maria."

The children are cut out of the lower portion of the figure of a bishop or abbot, c. 1530, showing the chasuble, staff of the crozier with vexillum, and dalmatic. On the reverse side of the shield are portions of canopy-work, with a representation of the Resurrection and a small fragment of the figure of some saint.

In some instances the new engravings will be found to have on the now reverse side a foreign design, as at Harrow, where, when the brass on which an inscription is written is turned, there will be seen a fragment of a German brass, in bold relief and of beautiful design, in conception and feeling far beyond anything attained by the English brassworker. But the various forms of palimpsests are in the main antiquarian curiosities. Their historical interest lies in the fact that they effectively demonstrate that neither in the sixteenth nor in the seventeenth cnturies was the destruction of old brasses caused by any general dislike of this form of memorial; on the contrary, a brass was often only taken up and sold, to be forthwith reversed and replaced in memory of some contemporary worthy.—*Edinburgh Review.*

The Non-Usage and Misuse of Churches

AT the annual dinner of the Royal Institute of British Architects, that was one of the features of the recent meeting of that body in Edinburgh, the Right Hon. the Lord Justice-Clerk, said some things that were quite well worth saying, in proposing the toast of the evening, *i.e.* "The Royal Institute of British Architects and the Allied Societies." Among other things, he said that there were no people in the world with whom he personally had more sympathy than those belonging to the profession of the architect. All other workers in art did pretty much what they liked; they could be successful or unsuccessful, and the work they produced, even if of the best, would not be looked at every day—it might be put away in a house or private gallery; but the work of the architect must be seen every day. The poor architect might stand in front of his own work and tell everyone who passed how he had been cut down as to the money he had to spend, and how he had been squeezed by public bodies and others to add what they thought would be an improvement, but what he thought would be abominable, and if he did he thought he would get the sympathy of all right-thinking men. He was glad to say they had a great revival of public taste and a great cessation of the ordinary practice, which existed a good many years ago, of everybody, whether he had taste or not, expressing his opinion and urging his views about everything that was done in regard to the architecture of the city in which he lived. There was a great improvement, no doubt. He was not going to enlarge on that; but, being a practical man, he would like to say a word to the architects all over the country as to what they ought to do with their buildings. An architect erected a beautiful building, the admiration of all who saw it. Happy were those who saw it before it had been interfered with. If he returned three or four years afterwards, he might find it perhaps plastered over with notices and with abominable posts with square boards on top stating that this was the work of So-and-So, and the price of admission into it was threepence. It was enough to make the architects of St. Giles's rise from their graves with shame that the Ecclesiastical Commissioners of the city kept the doors of that church shut against every one who wished to go in to see the beautiful architecture and, it might be, sometimes to sit down and reflect in the quiet of that noble building. But those men at the door, with a demand for threepence in order that nobody but the aristocracy should be able to get in! Was it decent and right that that beautiful building, dedicated to the worship of God, should be a building where people had to pay

to enter? It was not good for architecture that there should be anything of the sort. He should like, himself, in going into that church, rather than find it empty except for a few empty-headed tourists talking irreverently, to see a lot of poorly-dressed old women going in there in the course of the forenoon—going in quietly and thinking a bit. It might do a great deal of good to a great many of them, and the church would look far better for it. He would suggest to the Lord Provost that he should consider whether it was right that the noble building, dedicated to the worship of God, should be a place where people had to pay before they could go in. Then at Westminster Abbey, what did they see? A notice, "In this way," "Out this way," and a photographer at the entrance-door selling photographs for gain. It reminded him of the old money-changers. Inside they saw a number of big placards, in five or six languages, describing the building and tied round the pillars! And there were worse things than that in Westminster Abbey. He hoped they would all set their faces against the execrable practice of loading the walls of beautiful churches with monuments and tombstones, and splashes of soapsuds that were intended to represent clouds, with impossible angels, and somebody lying in a dress made in the time of Queen Elizabeth. He thought an architect should make it a stipulation before he erected a building that nothing would be put in it and no niches would be cut in the walls without his approval and consent. Why did we surround our churches, about two feet off from the edge of the building itself, with a railing which disfigured the building and had no other effect but to form a receptacle for old hats? And if there was anything to clear out, the scavenger had to climb the railings to remove it. At one time St. Giles's was enclosed with wrought-iron railings, which he did his utmost and ultimately succeeded in getting removed. He would never have been able to get the railing removed unless he had told the Commissioners it was splendid wrought-iron, and any one would give them something to be permitted to take it away. A contractor gave them 25*l.* for it, and he was allowed to take it down. The abominable railings put around St. Paul's Cathedral were not put round it to any good purpose at all. He could mention a great many cases in Edinburgh in which the same sort of thing had happened.

ILLUSTRATIONS

PALISADES TRUST & GUARANTY COMPANY'S BUILDING, ENGLEWOOD, N. J. MR. AYMAR EMBURY, IId, ARCHITECT.
ENGLEWOOD, N. J.: THREE PLATES.

THE exterior of this building is built of local white sandstone with a coarse-pointed surface. The exterior woodwork is of chestnut, stained greenish gray. Roof is of French A-shaped tile, flashings and gutters of copper. Tile panels on the exterior are of red tile laid herring-bone, with white and green tile insets. The terra-cotta panels, inset in the stone, are buff, white and green. The glass is of plate with a ¾-inch wide lead. The building was designed to furnish the utmost amount of light possible. In the basement are offices to rent, the first floor is used exclusively by the bank, the public space having corners cut off at forty-five degree line, so that the treasurer, from his desk, is enabled to see every person entering the bank, and so that depositors may at once see the safe-deposit vault, which the bank officials consider a good advertisement.

The interior is finished in red oak, stained brown with silver lines to frame panels and for letters. The coupon-room, treasurer's-room and reception-room have beam ceiling and are wainscoted through the entire height. The public space is open to the roof with a heavy beam ceiling of red oak, forming panels which are finished with buff sand-finished plaster. Over the treasurer's-room and over end of working-space runs the director's-room, and over reception-room is the president's office, reached by stairway between treasurer's-room and reception-room. This is wainscoted eight feet high and has ceiling beams stencilled with blue, white and gold. The safe-deposit vaults are finished on the exterior with gray steel paneling, the doors with jiggered copper, the silver-storage vault is behind the safe-deposit and book vaults and also on the basement floor under the safe-deposit and toilet-rooms. The space over the coupon-room, storage-rooms and safe-deposit vault is used as the janitor's quarters.

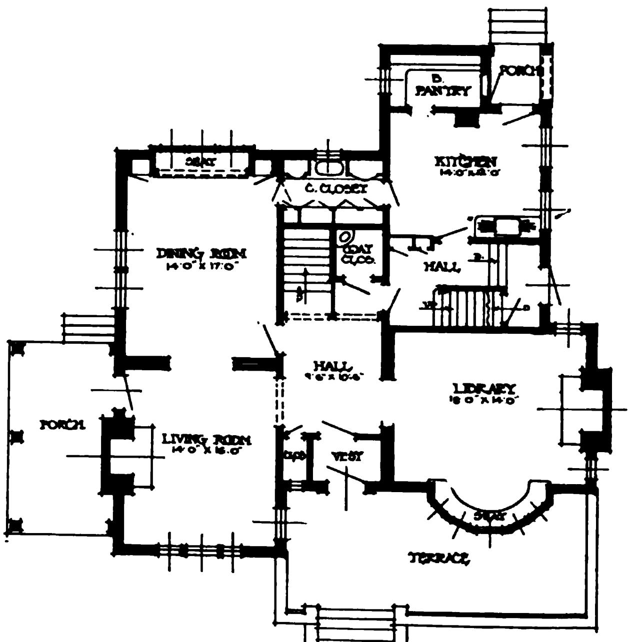
The color-scheme throughout the interior is brown-stained oak with buff plaster ceiling, beamed throughout. The floors are monolithic, buff with dark brown borders. The bronze-work in the front of the teller's cage, the wire bronze-work of teller's cage, and between teller's cage, treasurer's-room and working-space, is also dark green. The electric fixtures and hardware were designed especially for this building and are of the same dark green finish. Heating is by steam throughout. There is no artificial method of ventilation, the dormer-windows through the roof in the rear, over the working-space, taking care of the ventilation in summer. The scheme throughout the banking portion of the building involves the use of as much leaded glass as possible, so as to permit all the portions of the building to be under observation of the officials.

SYNAGOGUE OF THE FIRST HUNGARIAN CONGREGATION, OHAB-ZEDEK, WEST 116TH STREET, NEW YORK, N. Y. MESSRS. HEDMAN & SCHOEN, ARCHITECTS, NEW YORK, N. Y.: THREE PLATES.

Structure is semi-fireproof, built of brick with iron beams, and has a modern trussed roof. The interior is Gothic in style, and was designed to follow the character of the former synagogue occupied by the congregation.

The building is placed on a lot running north and south. As in orthodox synagogues the sanctuary must be placed at the eastern end, a small synagogue was planned in the basement with sanctuary in the east to comply with the church law. In further compliance with church laws, seats for the men are placed on the ground, and those for the women are in the gallery. In order to shut off any view from the floor seats to the gallery seats, or vice versa, a high and irregular shaped railing has been erected. Fire-escapes are planned as shown, giving increased exits, through the windows at sides, down to the main floor, and at back through two doors to the lot at rear. Ventilation is secured in lower part of building by means of openings on the side and in the upper part by openings front and rear.

HOUSE OF MR. HOLT, BOSTON BOULEVARD, DETROIT, MICH. MR. ALBERT KAHN, ARCHITECT, DETROIT, MICH.



PLAN OF HOUSE OF MR. HOLT, DETROIT, MICH.

HOUSE OF DOUGLAS STEWARD, ESQ., PITTSBURG, PA. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

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ENTRANCE PORCH: BUILDING OF THE PALISADES TRUST & GUARANTY CO., ENGLEWOOD, N. J.

DOORWAY: SYNAGOGUE OF THE FIRST HUNGARIAN CONGREGATION, EAST 116TH STREET, NEW YORK, N. Y.

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ALTHOUGH fourteen of the principal persons whom the Capitol Investigation Commission felt should be prosecuted for fraud on the State of Pennsylvania have at length been indicted, though allowed their liberty under heavy bail-bonds, and, though it is expected that indictments can be procured against eighteen other persons, we doubt whether honest men have much cause for jubilation. Not only can the defendants allege, and support the allegation with proof, that many of their most reprehensible actions have been done within the letter of the law, but we do not believe, as we review the outcome of the various efforts at reform in Pennsylvania, that the greater part of the accused men, if not all of them, will have any great trouble in evading punishment, though they must endure censure. Already we are told that, in place of pursuing these cases with promptness and energy at the coming term of court, the cases must go over to the January term at least, because the court dockets are already crowded with cases of older date. This delay will not only give a chance for public feeling to die down and interest itself in fresher matters, but will enable the members of the Republican "machine," if they benefited by the stealings, to exert themselves, in those efficient ways they are so familiar with, to bring about, through the November elections, as many favoring changes as they can devise in the personnel of those who are to prosecute, consider or testify upon the cases.

THE architectural profession in this country is made distinctly poorer through the death of two of its younger members within the passed fortnight. Owing to the capsizing of his canoe on Lake Ossipee, N. H., Mr. Ernest M. A. Machado lost his life and so brought to an end an unusually promising career, for the work he had already accomplished in his few years of private practice, mainly domestic work along the "North Shore" and in and about Salem, Mass., where he resided and had his main office, was very individual in type and, what was better and more promising, evinced in a marked degree both feeling and refinement. As he was blessed with a very winning manner and, so, easily made friends, he had every chance of eventually becoming one of the leading architects of his day, and that he was making progress in this direction is shown by the fact that he had offices not only in Salem and Boston, but had recently opened another in Ottawa, Ont., in partnership this time with Mr. Arthur L. Weeks, of St. John, N. B. Mr. Machado, who was, we believe, only in his thirty-third year, acquired his architectural training at the Massachusetts Institute of Technology, with practical experience later in Boston offices.

EVEN under the slow rate of progress hitherto made in building the Cathedral of St. John the Divine, George Lewis Heins was young enough to entertain a justifiable hope that he might live to see that structure nearly, if not wholly, completed; and the opportunity of building a great and costly cathedral in what is likely to be the largest city in the world is one of so unusual a type that all must regret that the pleasure of carrying out the design to completion has already been denied to one of its two designers. Mr. Heins was born in Philadelphia in 1860, and acquired his education in architecture at the Massachusetts Institute of Technology, and in 1882 formed a partnership with Mr. C. Grant La Farge, only seven years before the firm won the competition for the Cathedral. Naturally this success attracted the attention of those about to build churches and for a while it seemed as if they might specialize as ecclesiastical architects; but whether they had shot their bolt or were too much taken up with the Cathedral, the result, so far as our observation goes, was rather disappointing, as the churches of theirs we have chanced to see have seemed rather dry and uninteresting. In 1899, after having served for some time as Capitol Commissioner, Mr. Heins was appointed State Architect, and the harassments that inevitably fall to the share of those who undertake to fill such offices had much to do with bringing about his death.

THE fate of the Cathedral of St. John the Divine now becomes more than ever an interesting subject for speculation. Will the building-committee, of to-day and of to-morrow as well, be content to allow the surviving partner to carry out the work according to the drawings as they now stand, or will they, as strong and wilful men are joined to the Board, insist on "improvements" or curtailments, changes which a single

architect might be less able to resist than partners mutually supporting one another's arguments? The original scheme has already been varied from widely, partly doubtless through the architects' own volition, but also to great extent, it is generally believed, because of pressure exerted by certain members of the building-committee. If further changes should follow, New Yorkers might have here, in a single building erected within a few years, an example of those interesting changes and developments in style that were worked out in the course of centuries in so many of the European cathedrals.

THE figures just given out in connection with the Hudson Terminal Building, on Church Street, New York, are certainly impressive and suggest that before long we may have an instructive lesson in the expeditious handling of great crowds, for it is said that it is expected that 182,000,000 persons will pass in or out of the building in a year. This, to be sure, means only some 600,000 persons daily, and the figure to most will not seem very impressive. But the bulk of this flow is the regular diurnal night-and-morning flow at the hours of opening and closing business, the "rush hours," and the man who has watched military processions pass and recalls how they seem unending will understand the coming problem better when he pictures the difficulty of entraining or disentraining, within the few minutes New Yorkers are willing to give to such necessary processes, three hundred regiments in the morning and as many at night. Besides, there is the minor task of enabling the ten thousand stomachs the building itself is expected to hold—when full—to reach home and dinner with the promptitude demanded by wives and boarding-house keepers. If the full complement should seek the thirty-nine elevators sharp on the closing-hour, with the usual assortment of bundles and suit-cases, it would take the best part of an hour to empty the building. The salvation of the situation lies, perhaps, in the fact that the occupants of office-buildings have a more leisurely regard for the sanctity of the closing-hour than have their less-favored brothers, the mill-hands.

A CASE we find reported in a Southern paper, so it may or may not be of recent date, is of interest; it is that of Boller *vs.* City of New York, 102 N. Y., *Supp.*, 729; a case wherein we identify clearly neither date nor incident. Boller, an engineer, made a contract with the city to design and supervise the construction of a viaduct for a commission of five per cent. on the cost. This proved to be $166,298.09, and the city discharged the claim, paying the contractors and engineer as agreed, the latter giving a receipt in full. Later, the contractors, alleging that the city had broken its contract through not allowing them to begin work at the appointed time, thus causing them certain losses through the increase of price of materials and labor, brought suit for damages in the sum of $53,824.06, and recovered judgment. The engineer, learning in this way that the cost of the viaduct to the city had been more than he supposed, naturally asked for five per cent. on the second payment to the contractors, and on being denied brought the suit here cited. The court, however, held that the engineer was not entitled to recover, arguing that the damages paid to the contractor did not, when a fair interpretation was given to the plaintiff's contract with the city, constitute a part of the cost of the viaduct, any more than would the damages the city might have had to pay if some one, injured during the progress of the work, had successfully sued the city. It seems as if this decision should go to a higher court for review, for though the contractor actually did sue for "damages" the city had to pay the claim because it was shown that the cost to the contractors had been enhanced by the amount claimed. Doubtless the fact that the engineer had given a receipt in full had its influence with the court.

AN Associate Member of the Institute of Civil Engineers, Mr. Alfred B. Joscelyne, comes to the support of Mr. W. H. Brown's contention that the use of rusty iron in reinforced-concrete work, particularly where such rusty iron comes into direct contact with clean or rusty stirrups, is very risky, to say the least. Mr. Joscelyne writes that he has "seen such a case, and when the beam was cut open it was found that the stirrup had been entirely eaten away by the rust at the point where it came in contact with the bar." The weight of the testimony at present seems to be against the use of rusty iron, at least in the shape of loose stirrups supporting tension-rods, for it is to be remembered that the positive testimony of observers who have discovered perishing under the stated conditions is of vastly greater importance than the negative evidence of even a greater number of observers who have found the metal under similar conditions in perfect condition.

IS there a converse of the theory and practice of the English law of light and air? In this country, perhaps, the matter is of nothing more than neighborly concern and the inquiry bootless. But there seems good reason why the law should have its converse side, in accordance with which one may in certain cases exact betterments from his neighbors, just as they, owners of dominant tenements, may exact damages from him if he invade their right to light and air. Almost every one in these days has enjoyed the great, if very temporary, pleasure of having his office or work-room suddenly flushed with a long-unaccustomed amount of light and air, owing to the demolition of an adjacent or opposing structure, and at that moment has become persuaded that light and air are very valuable assets and quite deserving of the law's protection. Now, if a man may be sued and made to pay damages for cutting off his neighbor's light and air, should he not, in turn, be able to collect a permanent dividend, or a lump sum, if he presents to these neighboring owners an amount of light and air they did not enjoy before? The present, and probably short-lived, fashion of building in American cities one-story bank-buildings has conferred on the owners of the buildings circumjacent to them such very real benefits in the way of an increase in their light and air that it really seems as if the latter ought to be willing to pay for them.

Paris Subway Stations

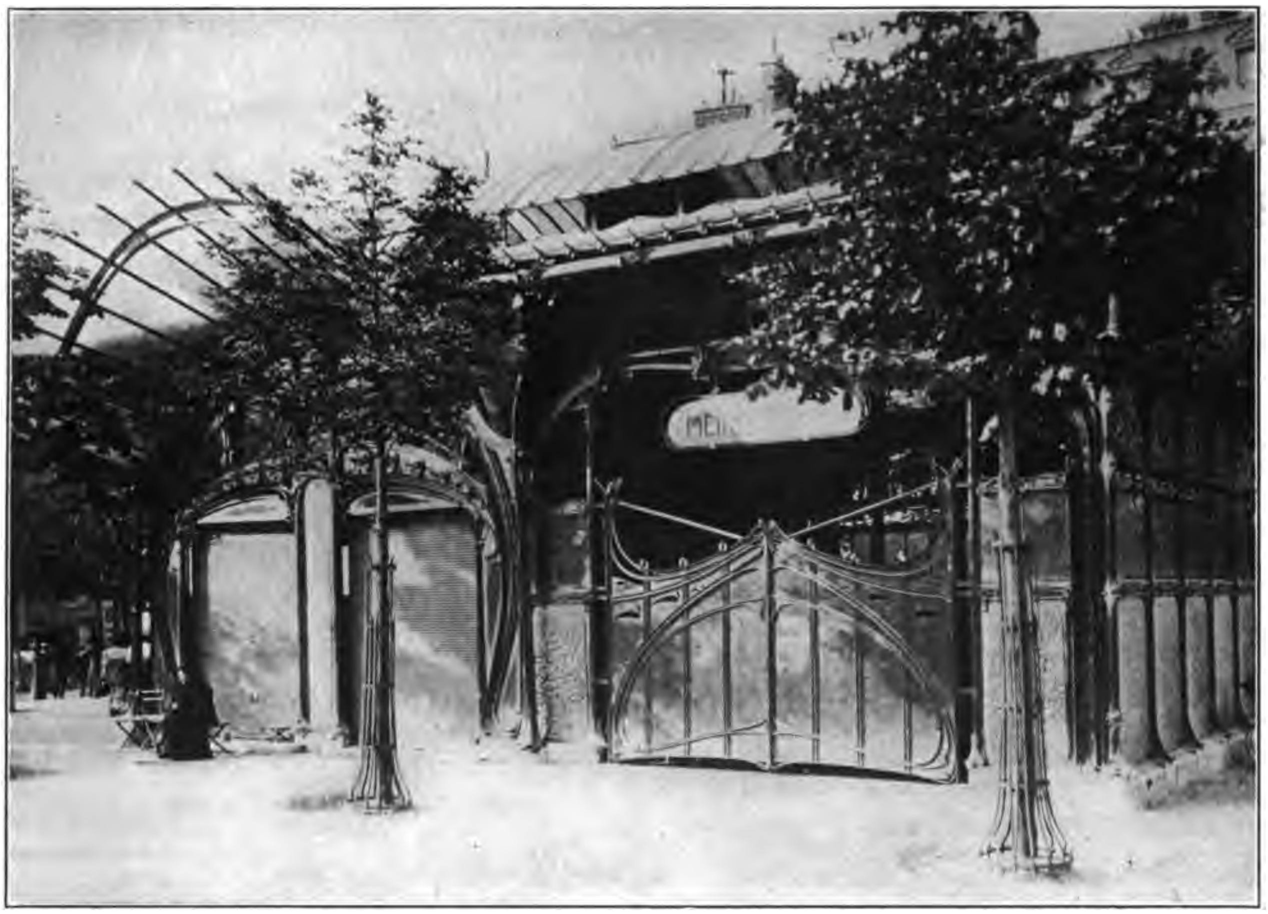
CIVIC improvement has of late become an object of much concern in the large cities of our land. How can they be made more beautiful and more pleasant to live in?—that is the question that is agitating so many people at the present time. Large sums have been spent to clear away whole city blocks; to widen streets; to create parks, boulevards and recreation-piers, and in general to improve radically existing conditions. Yet when a new problem, and one capable of control at the outset without any material additional expense, comes up, it has been left to take care of itself, with results anything but successful.

I am speaking of our subway-stations, all of which have been built within a comparatively few years, and to what effect we know only too well. In New York, when we go into the heavy monumental structures on the Battery or on upper Broadway, is there not a sense of entering a tomb or a mausoleum—a sense of depression which, to a sensitive nature, becomes, with its association of ideas, almost one of repulsion? The intermediate stations, too; how they crowd the narrow sidewalks with their awkward bulk! Or the uncovered entrances as they occur against the buildings at Forty-second Street or Fulton or Wall Streets—what is there, except the large sign, to distinguish them from the entrance to a basement café or bar?

SUBWAY ENTRANCE.

Again, in Boston, with its massive stone structures in the middle of Adams or Scollay Squares, or its even more solemn structures on the Tremont-street Mall of the Boston Common, could anything be much less appropriate either to its purpose or its surroundings, much less in character with the peculiar modern exigencies of the programme? It must be admitted that, taken abstractly, these buildings are happy enough in design. They are good in mass, proportion and detail; the materials are well chosen for harmony and texture. The straight, wide stairs are amply protected against New England's worst blizzards by these fortress-like canopies. Yet cannot the needs of the case be satisfied just as well, and at the same time much more cheerfully, and in a manner more in keeping with the rich natural background of Boston Common?

The Philadelphia subway is yet too short and too new to have developed a type of entrances, although the almost complete noiselessness of its rock-ballasted elevated road and its happily designed terminal at Sixty-fifth Street augur well for the good sense and taste of those in charge.



SUBWAY STATION, PLACE DE L'ÉTOILE, PARIS.

Let us cross the Atlantic to London and see if our predecessors in subway-building have arrived at any better solution of the question than we have. The now antique stations of the District Railway, with their dingy stairs and winding

corridors, their platforms restless with their kaleidoscopic jumble of many-colored advertisements, leaving bare no square inch of the wall-surface for the repose of the wearying eye, everywhere grimy and black with a thick coat of soot; no adjective can adequately characterize it except the one word, "nasty." The "Tuppenny Tube" stations are at least better in that they are cleaner; but the only stations having any interest for us are the new ones of the Bakerloo, the Piccadilly and the Charing-Cross-Camden Town tubes. These are entered in almost every case through ample stations, on lots bought for the sole purpose, with no attempt at letting stories above for office purposes. The exteriors are uniformly treated in an easily-marked glazed tile of a color between chocolate and deep crimson. They are entered through large arched openings. The interiors are bright and attractive, with glazed white and colored tile. The platforms are similar to those on Broadway, in New York, at 159th Street and above. This solution is practically out of the question with us, on account of the prohibitive cost of the land. This use of colored glazed tile for the exteriors is, however, full of suggestion. In a few cases in London, such as at Trafalgar Square, where they have stations standing free in the streets, they do not differ much from ours in New York.

The review is most unsatisfactory. Is there not some way of having stations which will be at the same time practical and ornamental to our streets; stations which will be in character with the modernness of the problem, that will cause even the least intelligent passer-by to realize that they are not, in one case, the survivals of a long-outgrown cemetery or, in the other, the entrances to basement bars? There is our problem. We have, however, one more resource to turn to for ideas.

The French are known as the artistic people of the world. They are most versatile, quite untrammelled by precedent, and capable of applying themselves with all openness of mind to new problems. They have taken to subways to the extent that it has almost become a mania with them. The city is literally being honeycombed in all directions from one end to the other with subways. They follow around under the boulevards, they traverse the city longitudinally from the Étoile to the Porte de Vincennes, or again from the Gare St. Lazare to Père Lachaise, they cross it again from the Gare Montparnasse to the Place de la Concorde, and from the Latin Quarter to the business district east of the Bourse—a complicated network of burrows, dipping deep under the Seine or twisting over and under one another, bound in a labyrinth of intercommunicating passages, as at the Étoile. They have an elevated road as well, which, part elevated and part subway, encircles the city on the line of the outer boulevards; but, as the boulevards are wide and the cars make very little noise, it is quite unobjectionable. These subways mean many types of stations in many parts of the city. Do they obstruct or disfigure the streets? Let us see.

The first thing we notice is the extreme originality of their treatment (it is due to the genius of one of the leaders of the "Art Moderne" movement in France, Hector Guimard, an ardent disciple of Horta of Brussels)—a treatment quite different from anything we have in America. It is the freest of Art Moderne, treating each material in an entirely abstract manner for what there is in the material itself, with no apparent reference to precedent. Cast-iron is moulded into forms appropriate to the structure and strength of the material and the exigencies of mould making. The wrought iron, be it in the small channels, or angles, or in the plates, is twisted or cut into forms which any workman could easily handle. The glass and the terra-cotta are treated in big, simple rectangles, easily cut or moulded to their respective forms. The concrete or stone bases have simple forms, easily worked. Gutters and down-spouts are in evidence wherever necessary, and at the same time most artfully incorporated in the main design. The larger stations, except the one opposite the Opéra, are all covered, as are the smaller ones

SUBWAY STATION, PLACE DE L'ÉTOILE, PARIS.

SUBWAY ENTRANCE IN THE CHAMPS ELYSÉES, PARIS.

SUBWAY ENTRANCE, AVENUE DU BOIS DE BOULOGNE.

SUBWAY STATION, PLACE DE LA BASTILLE, PARIS.

where the streets are wide enough, but in the more crowded places the entrances are quite open. The stations throughout are most practical as to sizes and arrangement of exits and entrances, and disposed so as to give as direct an entrance as possible down to the platforms. The entrances are further provided with corrugated-iron shutters, which can be lowered during the closing hours at night to keep out intruders. Yet all this practicality is far from being obtained at the expense of an artistic and attractive appearance of the whole. In fact, that is the most interesting feature of these stations—the ingenious manner in which the two are welded.

Take the typical uncovered stations of which we show two views. The straight flight of stairs enclosed by a low railing, the graceful arch over the entrance with its suspended sign, the prolongation of the uprights of the arch, carrying two exquisite flower-like lamps, so arranged as to cast their light down on the sign and stair-head at night; what could be more reasonable and yet artistic? Free, light and graceful, the play of color and texture in the yellow rippled glass of the roofs and marquise, or the upper part of the side walls, or the straw-lemon-yellow pebbled surface of the glazed fireclay wall-filling of the lower part; or, again, the harmonious painting in soft terra-cotta reds of the inside of these same panels.

The larger stations, especially at the Étoile, become more complicated; yet notice here, as elsewhere, the most adequate provision made for ventilation by openings under the wide overhanging glass eaves, the lightness and openness being obtained by the use of practically nothing but glass and iron; or—a minor item, yet one of some importance—how the rivets in all cases are left to show and give points of brilliance where they catch the light. Another feature of extreme cheerfulness is in the flaring marquises over the entrances; they actually invite one to enter, and enter one does, to descend into a bright station vaulted in white glazed bricks. The whole is characterized by a great freedom, yet by reasonableness of design. Some of the details may appear exaggerated to us, some of the *motifs* may seem lacking in repose and dignity, some of the corners may seem too complicated; it may be called a sculptor's rather than an architect's building, and in truth M. Guimard does model everything in his own shop. At the same time we must admit that, considering the almost entire lack of precedent, he has developed within a surprisingly short time a most consistent and suggestive architectural treatment.

SUBWAY ENTRANCE, RUE ST. ANTOINE, PARIS.

they stand an added charm rather than a disfigurement to the streets. Further, the manner in which the color scheme, sage green for the iron and golden yellow ochre for the lamps and signs, harmonizes with the surroundings only increases our recognition of the French sense of the fitness of things. Or take the station at the end of the Avenue Bois de Boulogne, where it enters the Bois, nestled in among the trees and shrubs, seeming to have sprung up quite naturally on its site. What could be more harmonious, more in keeping with such a delightful and luxuriant setting? See how every detail has been studied; how the greens and yellows and terra-cotta reds seem a part of the landscape, yet just different enough so that the station is easily marked at a distance. Or, again, study how the iron is partly wrought in the case of the 3/4-inch to 1½-inch channel uprights, fantastically terminated, or cast in the case of the spots of ornament or the conductors. Note

We cannot transplant this in America even if we might want to, for the cost of modelling iron and our storms and winds would prohibit it; yet, does it not open up a new field of thought in subway design, does it not have a message for us which, falling on good ground, may evolve a solution of the problem that will add to the beauty and agreeableness of our city streets?

GEORGE B. FORD.

"The Final Report on the San Francisco Disaster[1]"--V

THE conclusions arrived at by the writer as to the relative fire-resisting qualities of the different materials used for fireproof floors are set forth in considerable detail in his report on the disaster, entitled "The San Francisco Earthquake and Fire, 1906," a copy of which is in the library of the Society. These may be briefly stated as follows:

The segmental cinder-concrete arch, in short spans (8 feet or less), where the concrete was originally of good quality, developed the best fire-resisting qualities and strength. This material and this form of using it proved vastly superior to any other used for fireproofing purposes. This method was used in the Hotel St. Francis and in the ground floor of Haas's candy factory, at the corner of Mint Avenue and Jessop Street, and not a single square foot of the floor arching in these buildings was damaged in the least by the fire.

The next best fire-resistance was shown by the short-span (8 feet or less) cinder-concrete, flat-slab floor construction, in which steel reinforcing metal was used in tension. This method and material was used in the Merchants' Exchange, in which the damage by fire was inappreciable.

The next in order of fire-resistance was the same short-span, flat-slab method of reinforced concrete in which stone and gravel aggregates were used. This method and material was used quite extensively, the best results having been shown in the Mutual Savings Bank Building, the Bush Street and South offices of the Pacific States Telephone Company, and many others.

The next method in the order of fire-resistance was the reinforced stone-concrete construction proper in long spans, and where rolled-steel girders and beams were generally omitted. Where this method was used a very slight attack of fire was generally sufficient to cause the rupture of the concrete underneath the reinforcing metal, so that it fell away, exposing the metal. There were comparatively few buildings, however, in which this method of construction was used.

The material which gave the least satisfactory results, from a fire-resisting standpoint, was the hollow tile blocks, whether used as end or side construction.

In many of the hotels and office buildings a separate, flat, metal-lath and plaster ceiling was erected underneath the fireproof floors, which is in itself a fire-resisting barrier of considerable value, and a protection that must be taken into consideration in the economical design of fireproof construction. A well-designed and executed metal-lath and plaster ceiling remained in position intact in a New York Building Department test for a period of four hours from the time of starting the fire test. This represented a period of one and a half hours during which the temperature was raised from 70° to 1,700° Fahr., half hour from 1,700° to 2,000°, and two hours during which the temperature ranged from 2,000° to 2,300°, averaging approximately 2,100° Fahr. This ceiling was suspended by clamps or hangers made from steel stock weighing ½ pound per lineal foot, hooked around both sides of the lower flanges of the beams at 16-inch intervals; it supported approximately 7 square feet of ceiling surface per hanger. The furring consisted of flat bars weighing 0.6 pound per lineal foot, set on edge and running through slots in the hangers. The metal lath was stiffened with ¼-inch round steel rods at intervals of 7½ inches, and was laced to the furring bars with No. 18 galvanized-steel lacing wire at every intersection of the stiffening rods with the furring bars. These details are important, and are given in order to describe the essential features of a metal-lath and plaster ceiling which will give good efficiency. In hotels and office buildings a ceiling of this character will afford ample protection for the soffits of the floor beams, making it unnecessary to cover these separately with an additional fireproofing material. This fact also results in a saving in the thickness of the floor construction, and for this reason is an economical feature.

A fact that was demonstrated convincingly in the San Francisco fire was the undesirability of copper wire for fastening metal lath, the much lower fusing point of copper in numerous cases permitting the metal lath to drop away from the supports long before it would have failed had steel wire been used. This fact was particularly noticeable in the James Flood Building and in the rooms damaged by fire in the United States Postoffice Building. It has been the uniform practice in the Supervising Architect's Office, during the last ten years, to specify copper lacing wire for fastening metal lath in all the Government buildings. The ceilings in these buildings, therefore, cannot be expected to develop the best fire resistance in case of an actual test.

The report of the Committee tends to create erroneous impressions as to the province of metal-lath and plaster ceilings, and states that in many cases they protected the concrete floors. While this is true to the extent of their value as a fire-resisting barrier, the concrete floors, when composed of good material, were sufficiently refractory to have made a good record without the ceilings referred to. In the case of the hollow-tile blocks, however, where these were protected only by plaster, in nearly every case the soffit members of the tile blocks were cracked away, exposing the cellular spaces. The very general damage of this character indicated that this material possesses poor fire-resisting qualities. Wherever well-constructed metal-lath and plaster ceilings were erected under tile blocks, as in the James Flood Building and in the upper stories of the Spring Valley Building, they prevented serious damage to the blocks. This was demonstrated clearly by the fact that wherever the metal-lath and plaster ceilings fell away in spots, the tile blocks directly above were in all cases badly damaged. The tile blocks also showed great weakness and inability to resist the impact of falling bodies on account of brittleness, and numerous safes in the various office buildings very generally fell through the tile floors into the basement, breaking holes through the successive floors under them and sometimes inflicting serious damage to the mechanical plants.

On page 334[1] of the report the following statement is made: "The fire shows that a cover of lath and plaster directly upon the flange, protected again by the suspended ceiling, is the best. The layer of plaster alone on the flange will not protect."

In view of what precedes it, this statement, which is typical and characteristic of the report, illustrates the difficulty in arriving at general conclusions. A metal-lath and plaster soffit protection is well known to be less efficient that 2 inches of cinder concrete, held in place by metal-lath, with plaster applied over that. The efficiency of the metal-lath and plaster ceilings and their field of usefulness as fire-resisting barriers have already been discussed. An actual misstatement, however, is made in the latter part of the above quotation, in that there were several notable instances where a metal-lath and plaster soffit protection gave exceedingly good and satisfactory results, namely, in the Kamm Building and the Aronson Building. In both of these buildings crimped or corrugated wire-lath was wrapped around the soffits of the beams, the corrugations offsetting the wire surfaces about ¾ inch from the beam. This lath was placed in position before the concrete was laid, so that the edges were thoroughly anchored in the concrete. After the removal of the wood forms, plaster gauged with Portland cement was applied to the soffits, filling the spaces between the metal lath and beams solidly with the material and making a total thickness of approximately 1 inch of cement plaster protection. There were no metal-lath and plaster ceilings underneath the soffit protection, and in the Kamm Building this method was subjected to as severe a fire as occurred in any of the fireproof buildings in San Francisco, yet a careful examination of the building immediately after the fire did not show any failure whatever of this soffit protection. The same method was used with good results in the Aronson Building, where it was exposed directly to the flames without any intervening metal-lath and plaster ceilings.

The report of the Committee goes somewhat into detail in recommending certain methods of fireproofing columns and other important structural members. While the recommendations given are excellent for certain conditions, the treatment of columns, like fireproof floor construction, is a question of economical adaptation to the requirements.

The protection to the steel frame, as well as the method used in the floor construction, must in all cases be adapted to the character of the building and the quantity of its combustible contents. A building with floors finished in cement, marble or other incombustible material, with metal-covered woodwork and only a small quantity of combustible furniture and furnishings,

[1] Continued from page 99, No. 1657.

[1] Proceedings Am. Soc. C. E., March, 1907.

will not require as heavy and efficient protection for the steel skeleton frame as a warehouse, department store or similar building, in which will be stored large quantities of combustible goods and materials. A standard or uniform method of protecting structural members, to be used in all classes of buildings, would not be economical and would result in a hardship and waste in many cases.

An important fact, which is of interest to architects and engineers and to which the report of the Committee does not refer, relates to architectural terra-cotta. When properly designed, and set in a first-class manner, the results were generally satisfactory. In many cases, however, where the cores were large and the shells of the material were less than 2 inches in thickness, it spalled and cracked under moderate heat.

Another important lesson taught with great emphasis by the San Francisco disaster was the necessity of avoiding all forms of block partitions around stairway and elevator openings. These generally proved to be weak, both in the earthquake and in the fire, and almost invariably failed. The débris from such enclosing partitions fell upon the stairways, frequently breaking them down and causing irreparable damage. The failure of the block partitions also precipitated large quantities of blocks into elevator shafts, damaging the framework and doors and often injuring large portions of the mechanical equipment in the lower story. A reinforced-concrete partition, with vertical steel members anchored to the beams, or fireproof construction at the top and bottom, is vastly superior and preferable for enclosing openings of this character.

The writer is greatly surprised at the statement made by the Committee in its final conclusions on page 333[1] to the effect "that the destruction of fireproofing must be expected, and that it will have to be restored after a fire."

There is absolutely no question that, at the present time, methods and materials are available for fireproofing purposes which are thoroughly efficient and will fulfill the various requirements for different classes of buildings in an entirely satisfactory manner. By this is meant that when suitable methods and materials are used and adapted intelligently to the requirements of any particular building, such fireproofing will not be damaged seriously by the combustion of the inflammable contents of the building in the case of a fire. The efficiency of first-class methods and materials has been demonstrated in full-sized fire-and-water tests made at different times in the past, and numerous examples of entirely satisfactory fire-proofing were to be found in both the Baltimore and San Francisco conflagrations.

To reach correct and intelligent conclusions, and make definite progress in the development of fireproof construction, it is necessary to exercise intelligent discrimination and adopt that which is good and which has proven efficient in actual test by fire, and discard and abandon that which has failed and proved deficient. This principle was followed by the writer in his report, already referred to. By giving complete, detailed descriptions of the methods and materials of construction in the instances of satisfactory fireproofing, some of which have been referred to in the report, such as the concrete column protection in the St. Francis Hotel, the Shreve Building and others, and the fireproof floor construction in those buildings where good results were shown, definite information would have been available to assist architects, engineers and others in designing efficient fireproof construction for future buildings. Unfortunately, the report of the Committee is absolutely devoid of such detailed information, and an exceptional opportunity for rendering a public service has thus been lost.

There is, finally, a phase of this subject which has not yet been touched upon—the commercial side. The writer's long experience in the business of contracting for fireproof construction has afforded exceptional opportunity to study the attitude of capitalists, owners and architects on this subject. It will no doubt be a surprise to many to learn that in more than 95 per cent. of the fireproof buildings erected during the last five years the mistaken economy of owners and their representatives has prevented the adoption of good fireproof construction in that proportion of buildings. In every case the difference between a poor and mediocre method of fireproofing and a first-class and efficient method has not been in excess of from 2 to 4 per cent. of the cost of the building. As long as a cheap method or system of fireproofing complies with the building laws of the city in which the building is to be located, and fulfills the requirements for strength, the average owner is satisfied, and is unwilling to appropriate any additional money whatever for superior methods or materials. It is the same old story of "just as good" substitution.

When the owner, as is generally the case, has no practical knowledge of building construction and is incapable of judging of the merits of different methods and materials, he invariably adopts the lowest-priced method or system offered, or instructs his architects or representatives to do so. One of the incomprehensible things is the further fact that the average owner, or his business representative, thinks that he is fulfilling every moral and business obligation by offering to award the work to the concerns furnishing first-class and efficient methods at the same price that the poorest and cheapest methods are offered to them. This policy and method of placing contracts for fireproof construction is used almost without exception, even by large railroads and wealthy corporations.

In the case of all other building materials, such as stone, brick, steel, cement, etc., quality is carefully considered and the prices are graded accordingly; but in the consideration and selection of fireproof construction, which is probably the most important detail of a modern building, quality and efficiency have been entirely neglected up to the present time.

As long as owners and architects are unwilling to pay the small additional amount necessary to secure first-class fireproofing, they must expect results such as were shown in Baltimore and San Francisco whenever a conflagration of any magnitude occurs. It would seem, however, that the exercise of the most ordinary intelligence would prompt the owner of a valuable building to expend from 2 to 4 per cent. of its cost in order to secure exemption from damage to the structural parts of the building, and an additional 5 per cent. for the protection of exterior window and door openings in order to save the contents of the building from exterior attack by fire.

It is to be hoped that the recent great disasters in Baltimore and San Francisco will serve to show the great importance of recognizing merit and quality in fireproofing methods and materials, and demonstrate the necessity, as well as the ultimate economy, of using first-class and efficient methods of fireproofing in future buildings.

[1] Proceedings Am. Soc. C. E., March, 1907.

ILLUSTRATIONS

CHURCH AT KENILWORTH, ILL. MR. WM. WALLACE BLAIR, ARCHITECT, KENILWORTH, ILL.

ST. PAUL'S EPISCOPAL CHURCH, COLUMBUS, O. MR. F. S. PACKARD, ARCHITECT, COLUMBUS, O.

TEMPLE BETH-EL, DETROIT, MICH. MR. ALBERT KAHN, ARCHITECT, DETROIT, MICH.: TWO PLATES.

THE NORTHMINSTER CHURCH, 115TH STREET, NEAR ST. NICHOLAS AVE., NEW YORK, N. Y. MESSRS. LUDLOW & VALENTINE, ARCHITECTS, NEW YORK, N. Y.

The aspect of this little building after it shall have been completed at a later day is shown by the drawing let-in to a panel in the interior view.

THE FINNEY MEMORIAL CHAPEL: OBERLIN COLLEGE, OBERLIN, O. MR. CASS GILBERT, ARCHITECT, NEW YORK, N. Y.: THREE PLATES.

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THE NORTH WOODWARD M. E. CHURCH, DETROIT, MICH. MR. W. E. HUNTER, ARCHITECT, DETROIT, MICH.
DETAIL OF THE SAME.

NOTES AND CLIPPINGS

THE AGORA AT ATHENS.—On the east side of the Theseum in Athens, one of the best preserved temples of antiquity, the Greek Archæological Society has undertaken excavations for the purpose of laying bare the old Agora of the city. Foundation walls have already been found, which probably belonged to the *peribolos* of the temple, which evidently was similar to that of the temple of the Olympian Zeus in Athens. As soon as the surrounding land can be purchased, these excavations are to be continued. Dr. Dörpfeld is of the conviction that in this neighborhood the remnants of the Royal Hall will be found.—*N. Y. Evening Post.*

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APPARENTLY every one who takes, or hereafter may take, an interest in the Cathedral of St. John the Divine is going to be under obligation to Mr. Harry Hems, an English ecclesiastical sculptor who contributes his views on the several arts at frequent intervals and great length to the English architectural journals. It will be remembered that, a few months ago, he delivered himself of a slashing criticism of the sculptural work at the great cathedral on Bloomingdale Heights, and that, to everyone's surprise, the sculptor, Mr. Gutzon Borglum, came out with an acknowledgment that the carving was really even worse than Mr. Hems had declared it to be, but that he was not responsible; for, protest as he might to architects, building-committee and contractor, he could not succeed in having his models faithfully followed by the stone-carvers. This public declaration seemed to make it likely that, so far as future work was concerned, he would probably have less cause for complaint, though for the work already installed and paid for there seemed no obvious remedy. Fortunately, the authorities were awakened to the fact that the most important matter within their jurisdiction was not the balancing of the contractor's account with a satisfactory profit to himself, and it is reported that an agreement has been reached by all parties concerned under which all the detachable figures, some seventy-five in number, are to be taken down and re-cut, so as to conform better to Mr. Borglum's models. It is not often a critic finds himself so justified.

THE annals of invention and scientific discovery are full of tales of how the absorbed searchers after one, and a predetermined, end of their labors, have suddenly found that, though they have failed in their original undertaking, they have yet stumbled upon some hitherto unknown fact or unproved theory of great use to mankind, and because of this quite accidental discovery have acquired a name, if not much wealth. It would be quite in line with the history of other inventions if it should be found that a searcher after the best means of perfecting so unstable a thing as a flying-machine should suddenly awake to the fact that he had discovered a new method of erecting, to any height and in a more than ordinarily stable manner, the metal framework of a sky-scraper. It is reported that Professor Alexander Graham Bell, who has for some time been experimenting with his tetrahedral kites with much success, has perceived the adaptability of his tetrahedral cells to building, and has, at his summer place on Lookout Mountain, near Sydney, N. S., erected a tower seventy feet high and weighing five tons only, each of the cells being formed with six lengths of one and one-half inch pipe, four feet long, in the assembling of which highly skilled labor is not needed. That there may hereafter be no dispute as to facts, an inscription attached to the tower declares that the structure is "the outlook tower at Beinn Bhreagh, the first iron structure built of tetrahedral cells. F. H. Baldwin, engineer."

BECAUSE the Society of the Army of the Cumberland did not see fit to accept the final model for the equestrian statue of General Sheridan, which he had been authorized to prepare, Mr. J. Q. A. Ward has brought suit against thirty-one individual members of the Society, a step made necessary because of the fact that the Society is not incorporated, and so cannot be sued. We fear that these legal proceedings will but add another uncomfortable feature to a very unfortunate affair, for it does not seem as if the sculptor could gain anything but the uncertain pleasure of paying the cost of the suit. To be sure, there was a contract between the Society and the sculptor, but neither party lived up to its conditions, so, if one of them may sue for breach so may the other, and the result will be merely a "stand-off." As the Society can prove it gave the sculptor ample time for his efforts, and as they can prove their desire to be pleased and satisfied with the result, if they could be, we do not believe that any court will find itself justified in mulcting thirty-one honest and well-disposed gentlemen simply because what was satisfactory to the sculptor was not satisfactory to them.

THE folly of spending money on the costly decorative treatment of urban mercantile buildings when such decoration is to be obliterated immediately by sign-boards, a common waste to which we drew attention a short time since, is quite equaled by the idiocy of spending money on the expensive exterior treatment of country-houses, which are to serve only as a supporting background to wanton and riotous growths of one kind of vine or another. As we drive about the country with a

camera, we come upon many fine and architecturally interesting buildings—at least they once had that character—on which we do not care to waste a plate, simply because the result would show only the overpowering mastery of the vegetable over man and art. The vine properly applied and continually restrained is a very beautiful and desirable adjunct of good architecture, but when it is not skilfully applied and properly restrained, good country-house architecture has no worse enemy than the vine—unless it be the house-painter with his too-varied palette. In some ways it was an evil day when the *ampelopsis veitchii*—the so-called Japanese ivy—was introduced into this country to offend the eye with too luxuriant growth in the summer time and, in the winter, with the marring trail of its multitudinous suckers.

PROPERLY restrained and not given too nourishing food, the Japanese ivy is a beautiful vine, but only when it is kept a vine and not allowed to become a mere mat. Some years ago as, each morning, we passed the front of Columbia University Library, we watched with keen enjoyment the delicate shoots of a young vine as they crept over the faces of one of the great pylons that flank the esplanade, and only when it was too late to act did we perceive that the pylon, with its delicate tracery of vine, backed by a great weeping-willow, made, when light and shadow were just right, a most charming composition which many of our subscribers would delight to render in water-color did we but give them a chance; so we determined to have a negative made the next year. In the following spring we watched daily from the bursting of the first bud, the pushing of the first tendril;but the charming picture was never repeated: we had not acted with sufficient promptitude; the vine that formed once a charming accidental architectural accent had already become blowsy and was racing along to complete an eclipsing mastery. Columbia Library affords a very good example of the way in which the gardener is allowed to waste his employer's investment and injure art. To give the building its proper value and an apparent adequate support, the architects provided at the back of the esplanade at either side of the steps a handsome terrace wall of dressed and moulded granite, some six feet high, a capital background for a few low shrubs or a controlled vine or two. But now this stonework has wholly disappeared behind a thick and even mat of Japanese ivy leaves, coarse and rank. The gardener has unblushingly wasted the difference in cost between the expensive bush-hammered granite wall and one of loose pasture-stone and has, moreover, deprived the building itself of a needed architectural accessory.

THE curious and unexpected way in which interests are interwoven is shown by the dispute over the Collège des Écossois, in Paris, now seeking adjustment between the French and British Governments. This Scots College is on the Rue Cardinal Lemoine, only a short distance away from the church of St. Etienne du Mont, and when the Concordat was denounced and the law of "separation" enacted, the French Government took possession of the buildings and the funds of the institution, on the ground that the place was devoted to giving religious instruction under the auspices of the Roman Catholic Church, and in fact this was essentially the case, the institution being of recent years under the direct control of the Seminary of St. Sulpice. But, as soon as the confiscation had been effected, the matter was brought to the attention of the British Ambassador at Paris, and through him the British Government at once presented its respectful protest, the ground for the protest being that though, for many years, the institution had undeniably been devoted to religious education, it was not the intention of the founder that it should be so devoted, as his intention was to establish an institution of general learning. Consequently, instead of seeking to enforce confiscation, the French Government really had only the right to insist on a reversion to the original conditions and a compliance with the founder's bequest.

NOW the founder of these buildings, so plain and unattractive without, but so very interesting and rather beautiful within, was no other than King Robert de Bruce, who, finding his rival, John Baliol, had founded Baliol College at Oxford, determined to do in his turn as much for the education of the Scottish youth, and decided he would found a college of general learning in Paris; for, as everyone knows, France had for long years been the hospitable home of Scotchmen who had been drven from home by political changes, or were attracted thither from ill-provided homes by the high pay and greater advantages offered by service under the French flag. It must give rather a shock to the members of the White Rose League, both in England and in this country, to find the British Government bestirring itself in defence of this particular institution, for in the anteroom that precedes the very interesting chapel is a sarcophagus of dark marble, in which, in a silver casket, rests the heart of James II., the last of the Stuart kings!

WE believe we recorded, some years since, the case of a grower of roses on Cape Cod who collected a considerable sum from a railroad because the smoke from its locomotives in their round-house killed his plants, and this had a bearing on the general smoke-nuisance question. Now we find that an English nurseryman has collected damages from a street-railway company because it had paved the street adjacent to his grounds with creosoted wooden blocks. It does not appear whether the plants were poisoned by solutions draining from the blocks or whether the damage was in anyway caused by interfering with the natural aeration of the soil. But the case reminds us of a matter we have meant for some time to speak of, the increasing danger that attends the practice of covering our streets with practically impermeable coatings—asphalt, concrete and brick laid in cement, which continue through the hot weather the evil caused naturally in the winter time by frost. While small vent-pipes at intervals penetrating from the surface below the concrete foundation of the modern road-bed would not prevent the "manhole explosions," they might prevent some of the cellar explosions due to gas that has worked from leaking street-mains into the cellar, simply because what may be called its natural means of egress had been closed by the impervious upper coating of the roadbed.

Foundations—II[1]

AN informal discussion at the annual convention, July 10, 1907, of the American Society of Civil Engineers on the following subject:

"(a) What is the best system of construction for foundations of heavy structures on ground such as that of the City of Mexico, which is an alluvial deposit about 300 feet in depth, and similar in character to that at New Orleans?

"(b) Will iron or steel used in foundations, independently or in combination with other materials, last indefinitely when in direct or indirect contact with water?

"(c) Will the strength and durability of concrete in foundations be affected, if before setting there is: (1) An excess of water; (2) lack of compression; (3) too rapid desiccation?"

F. G. Jonah, M. Am. Soc. C. E.—Foundations for all heavy structures in New Orleans are now made of piling. This is the best foundation for that locality because, in the absence of bedrock or hard-pan, piles give sufficient frictional resistance to sustain all necessary loads.

The soil of New Orleans is nearly always pure alluvium many hundreds of feet deep. There is, in various parts of the city, an underlying stratum of shells and beach sand, usually 40 feet below the surface and from 6 to 8 feet thick. Piles can be driven through this, but it is not considered necessary to do so, and they are stopped in this stratum. This material was encountered in driving the foundation piles for the new passenger station now being built at Canal and Basin Streets, and in the foundations for the Hagan Avenue Bridge, one mile away, while, just below the city limits, where the new Frisco Docks are being constructed, and where more than 36,000 piles have been driven, alluvium was the only material reached. The same condition obtains on the work of the new Sugar Refinery, also just below the city limits, where more than 6,000 piles have been driven. On the dock work, which is under the writer's charge, 75-foot piles have been driven in trenches excavated 15 feet below the surface, so that for 90 feet, at least, there is nothing but pure silt. Careful records and experiments show that in this material a 60-foot pile will sustain a load of 65 tons without settlement, although 16 tons per pile is the average load calculated. While these piles may be driven very quickly—as much as 4 inches per blow—it is often found that, if they stand partly driven over night, on resuming work next morning several blows are necessary to start them.

The writer has also noticed, in driving piles for trestles in New Orleans and vicinity, that while a pile might go as much as one foot at the last blow, yet by the time the deck and track were on, the trestle would stand up under ordinary traffic.

The piles used are pine sticks, cut in Louisiana and Mississippi; they are very straight and smooth, will average about 60 feet in length, 6 inches in diameter at the small end and 13 inches in diameter at the butt, and are now furnished and driven for from 30 to 35 cents per linear foot.

The occurrence of the sand and shell stratum in patches can be accounted for on the assumption that it formed part of the old coast line or probably formed small islands which were gradually connected with the mainland and covered by the upbuilding of the Mississippi Delta.

The great holding power of piles in this silt is due to the free lateral movement of the soil causing the pile to be firmly gripped as soon as driven. The extraordinary lateral movement of this soil, and facts relating to its depth and subsidence are referred to in the discussion by E. L. Corthell, M. Am. Soc. C. E., on the paper entitled "The Reclamation of River Deltas and Salt Marshes."[2]

In driving piles in this material some care must be exercised in their spacing, as it is possible to drive them too close to one another, in which case the frictional resistance would be measured by the circumference of the cluster rather than by the circumference of the piles separately—3½ feet is a fair average spacing.

This foundation is undoubtedly the best for New Orleans as the piles go below the level of basements, sewers and canals; and modern buildings are being erected on such foundations without any settlement. The foundations will also be permanent, as wood, in soil of this character, when carried below the line of atmospheric and moisture changes, lasts indefinitely. This has been abundantly proved in New Orleans where, in boring for wells, logs in good preservation have been encountered hundreds of feet below the surface. Recently, in excavating for the basement of the new passenger station at Canal and Basin Streets, perfectly sound cypress trees were uncovered 12 feet below the level of Canal Street.

Excavations frequently expose old foundations on cypress footings in as good condition as when put in a century ago. These footings are usually from 4 to 6 feet below the surface.

The drainage-works of the city, now in course of construction, will probably lower the water-level to 8 feet below the surface, so that in the future timber foundations may not last as well as they have in the past, unless carried below that level, which of course is the case with pile foundations for new structures which are provided with basements.

As to Mexico City, the writer has observed that the soil is not similar to that of New Orleans, for there is no underlying hard stratum; the hard stratum is on the surface, and is a material known locally as "tepetate," something like hard-pan, overlying a great deposit of volcanic ash. With the drainage of Lake Texcoco, and the consequent lowering of the water-level in the city, the surface soil is settling and carrying with it the buildings, and as the settlement is not uniform, many structures are being cracked.

The speaker believes that piles would be the best foundations in the City of Mexico; but, as the cost of timber would be excessive, the situation could be met with concrete piles. There might be some difficulty in putting down concrete piles of as great a length as the timber used in New Orleans, but, a shorter pile, of greater circumference and with a greater taper, would undoubtedly answer, if it were below the water-level and well below the level of excavations for basements and sewers.

As to the strength and durability of concrete being affected by an excess of water and lack of compression, this is one of the questions upon which the engineering profession has changed ground in the past fifteen or twenty years. Formerly, all specifications stated very definitely that an excess of water must be avoided; they contained the clause, "just sufficient to flush to the surface when thoroughly tamped," etc., or, in other words, dry concrete was almost always used. To-day the reverse is the case, as wet concrete—decidedly wet—is the rule. The speaker believes that no material injury arises from the use of a wet mixture, provided the forms are tight and do not permit the mortar or cement solution to leak out. This is a change brought about very largely by the contractors of the country. Where impervious concrete is required, the wet mixture will give the best results; also, in filling irregular forms with concrete the wet mixture will fill angles and corners in which it would be very difficult to tamp a dry mixture; consequently it gives the average job a much better appearance when the forms are removed.

G. E. P. Smith, M. Am. Soc. C. E.—In relation to the effect of rapid desiccation on concrete, the speaker's experience has been gained in a country where for days the temperature stands above 100° and the humidity below 10 degrees. On one occasion the local weather-observer, interpolating outside the Weather Bureau tables, unwittingly reported the relative humidity as a negative quantity. The ground also becomes intensely dry, as there are often periods of from 5 to 10 months in which there is no rainfall to counteract the surface evaporation. Concrete work, however, is carried on throughout such seasons without interruption, and most contractors take no further precautions than are taken in humid climates.

Under such conditions, the effects of "too rapid desiccation" must be extremely severe, and if engineering structures are endangered from this cause the fact would be readily apparent.

One of the severest tests of concrete is in sidewalk construction, and some utter failures have been recorded. In one instance 13 miles of newly-laid sidewalk were taken up at once; and 3 miles of sidewalk laid this year are disintegrated to such an extent that they will be removed and replaced this summer; however, many more miles have been well built, and after years of service are in perfect condition, without cracks or worn holes. Consequently, concrete sidewalks are still the most popular, and, from the municipal standpoint, the most satisfactory type in the

[1]Continued from page 78, No. 1654.

[2]"Transactions," Am. Soc. C. E., Vol. LIV, p. 83.

arid region, which includes the Southwestern States, together with the northern half of Mexico.

It is found that certain brands of cement which are satisfactory for tunnel and heavy foundation work are positive failures when used for sidewalks. The rapid desiccation of the latter must, in part, account for this difference. On the other hand, most brands of cement do not suffer in this way. Concrete, for sidewalks and for other purposes, is usually mixed and laid, and sets in the ever-burning sunlight. After some hours, and when thoroughly set, it is covered with dirt or boards and wetted, and usually comes out in good condition.

As soon as set takes place, further desiccation can usually be prevented. In making cement pipe the speaker has kept the concrete wet for a week, but bridge piers are sometimes finished in midsummer with little or no sprinkling.

Where freshly-laid concrete is to be exposed to rapid desiccation a cement should be selected which is known to withstand such conditions. The defects of high-limed and uncured cements are probably accentuated by desiccation. A suitable cement, however, will withstand almost any conditions met in practice, and concrete work in the arid region is not limited by this obstacle.

Incidentally, it may be added that the aggregate used in Tucson, Ariz., is a basaltic lava, identical in composition and structure with that of Tlalpam, near the City of Mexico. This lava rock is also used for macadamizing the streets, and forms a well-bound surface without the aid of a roller.

J. C. Meem, M. Am. Soc. C. E. (by letter).—Referring to the question of concrete in foundations being too wet or drying too rapidly, or the necessity for ramming, the results of some recent observations of actual conditions will be given.

In underpinning the buildings along the line of the Rapid Transit Subway in Brooklyn, it was sometimes necessary to go to a depth of 40 feet below the curb line, the lower 4 feet being sand below the level of mean high-water. The method pursued in all cases was to cut out sufficient brickwork on each side of the pier to be underpinned just above the floor level and insert needle-beams (generally 20-inch 80-pound I-beams, 18 feet long) in sufficient numbers to carry the load. These were wedged up from a cross-blocking of heavy timbers, and cross-needle-beams were set into recesses cut in the piers, a middle beam being put through a hole cut in the pier when necessary. These beams were cemented and wedged to an absolute bearing, and were then grouted in so as to form practically a component part of the pier.

An excavation, about 8 by 8 feet square, was then made under the foundation to a depth of about 4 feet, and supporting chains were inserted to carry the hanging portion of the foundation. A 6 by 6-foot pit was then box-sheeted, that is, horizontal sheeting was used and set in by the well-digger's method. Cement was used in the back of the sheeting to insure filling all spaces, and holding the upper strata of loose sand in place. As soon as water-level was reached, interlocking steel sheet-piling, about 5 feet 6 inches long, was set up inside the pit in a 5 by 5-foot square and driven down till its top was within 6 inches of the water-level; then, without pumping, the sand was cleaned out to a depth of 4½ feet and concrete was deposited through a chute until the pit was filled to about one foot above the water line. Dowels of boulders or rods were left projecting from this in order to give a bond for the upper portion of the pier. As soon as the concrete had partially set, the remainder of the pier was filled in to within about 4 inches of the foundation level. After setting, this was grouted in with semi-liquid mortar, care being taken to fill every possible void by ramming and packing the grout well under the foundation. After about five days the beams were removed, a few at a time, and the holes in the brickwork were replaced with new masonry.

The deductions, from observations covering a large number of these piers, are:

(1) Concrete does not have to be rammed if put in sufficiently wet.

(2) In foundations, it is practically impossible, within the limits of common sense, to put in concrete too wet, always providing, of course, that the water is not allowed to run away.

(3) When concrete as wet as practicable is placed in foundations there is no danger of too rapid desiccation.

The writer believes that it is established beyond controversy that concrete should always be protected from drying out too rapidly, and when it is put in place very wet there is no need of protection, except where it is exposed to the direct rays of the sun in hot weather.

Señores Pablo Solís and Octavio Guzmán[1] (by letter).—This theme belongs to the engineers of the City of Mexico and New Orleans, and, as specialists upon the subject in question, it is hoped they will place their opinions before this society. By their experience, which has been recorded in special articles, we have been informed, that in soils of this nature, foundations of masonry are inefficient, because they yield and sink; that piling has not given good results, as may be seen by the bad condition of the ancient buildings of Mexico on this type of foundation; and, also, because this soil is so indefinitely compressible that a final settlement of the piles is never obtained. It may be observed that piles sunk to the limit of "the rebound of the hammer," continue to sink when, within a short time, they are subjected to further driving from the same hammer. We have also been informed that the practice of deep foundations is not good, because it does not diminish the settlement and necessitates laborious drainage, and that, on account of the currents produced in the subsoil by such drainage, these excavations are the cause of the cracking of many of the old buildings nearby; that foundations with sand have been successful in the construction of the Teatro Nacional; and that experience shows that the best construction for Mexico is the grating form, whether a grate or platform of wood or iron is used, or a monolithic plate of "béton" or equivalent material. This process it is understood gives good results because, by means of it, the following requisites which are indispensable for a good foundation in Mexico are obtained:

(1).—The distribution of the total weight over the largest possible area so as to diminish as much as possible the intensity of the load.

(2).—The shallowness of the foundation which avoids laborious drainage, which drainage causes internal currents resulting in damage to contiguous buildings.

(3).—The distribution of the load, so that its intensity will be the same at all points, if the ground is homogeneous and uniformly compressible throughout; and, if not, then the distribution of the load proportionately, so that its intensity does not exceed the reaction of the ground at any point. Finally it should be noticed that the builders of this capital, upon whose authority these observations are based, fix ½ kg. per sq. cm. as a safe load limit for foundations, and as a maximum load, which should be exceeded only in very special cases, 1 kg. per sq. cm., figures that represent the reaction of these soils.

The preceding facts give the essence of the usual practice in foundation construction upon the soils of Mexico City. Said facts or figures would give of themselves an adequate answer to the first part of the question under discussion, were it not that they refer exclusively to the condition of the subsoil of this city prior to the construction of the drainage and sewerage systems. Since these improvements, however, the quality of the subsoil has changed, and, therefore, as the data have changed, the process of foundation building must change. To what extent and in what manner practice in foundation work will be modified is not known, and the writers have many doubts which may be formulated in the following questions: What changes have been wrought in the subsoil by the drainage of the city? Has the modulus of ground reaction changed? To what depth has the water-level dropped? And, if it has dropped but little, should present foundations for this capital go down to "water-saturated ground," or should we build them superficially in the desiccated strata?

With respect to the last question, the writers believe that foundations should be built upon the surface of the diluted soil, for there the ground being semi-fluid, the water, on account of its incompressibility, acts as a powerful medium of reaction against the weight of buildings, and, to a certain extent, in accordance with the principle of Archimedes that a submerged body loses a part of its weight equal to the weight of the water displaced by it. From this point of view it may be considered that foundations upon gratings in soils as saturated with water as these in question, owe their efficacy against sinkage of the load they carry to the fact that they are, we might say, floating. The ancient buildings of this city built upon gratings are still in excellent condition. On this account, also, modern construction companies are justi-

[1]Delegates to the Convention of the American Society of Civil Engineers from the State of Puebla, Mexico. (Discussion translated from the Spanish.)

fied in constructing in the City of Mexico foundations with huge gratings of steel, iron and béton, and are also justified on account of the changes in the subsoil since the drainage in extending foundations to cover not only the base of the wall, but the whole area of the building, as has been done recently in the magnificent building for the Messrs. Boker.

In closing, the writers will refer to the last part of the topic under discussion: "Will iron or steel used in foundations, independently or in combination with other materials, last indefinitely when in direct or indirect contact with water?"

As mixed foundations of this nature are of very recent installation, it is not possible to find history concerning them that might be useful in passing judgment upon this subject. On the other hand general and numismatic archæology might contribute some data, especially the latter, as for instance in the case of Chinese iron coins, now found in museums, and which may have been for many years under water.

With respect to iron in salt water, it is known that, in the Harbor of Vigo, when the treasure was taken from some American galleons which had been sunk in Colonial times in that harbor, iron cannon were found with that treasure, the metal of which was extraordinarily altered and softened to the consistency of wax. We also have knowledge of the iron taken from the breakwater at Brest, which had been immersed for a century and was found half destroyed, the material, as attested by M. Lidy, civil engineer, containing hardly 56 per cent. of free iron, the remaining portion being in very bad condition, with the internal fibers almost destroyed, showing many eaten out spots. Both these cases, however, should be discarded, because the destructive effects were due to marine salts.

With regard to fresh water, we have no knowledge of data that would show how iron behaves after an indefinite period of immersion; the iron of hydraulic wheels, canal gates, and many other objects used in the industries, permanently immersed, apparently remains well preserved when subject to the continuous or, at least, to the frequent flow of water. In these cases deterioration due to wear by friction of water is greater than that due to oxidation, and, as the renewal of parts happens slowly, and original shapes are always retained, the illusion of the immortality of the metal is produced, which in reality is only perpetuity of form. In still waters oxidation is more rapid, but it reaches the interior of the metal very slowly, the first coating of oxidation formed becomes a protecting coat against the propagation of this deterioration, and a condition of permanent equilibrium and preservation seems to become established. Iron buried in foundations invaded by water is subject to these conditions exactly, and as the mass of foundation is strongly compressed, the lack of air renewal is complete, the temperature low and uniform, and the oxidizing forces are paralyzed. It is probable that iron in foundations, under these conditions, if it is not indefinitely preserved, at least its deterioration must take place very slowly; and as this deterioration consists in the chemical change of one body into another, the result, under the constant powerful action of the weight of the building, can only cause, in its turn, a very gradual settlement of the foundation, until, by necessity, a final settlement is reached. This will be the result even though the mass of iron is finally changed to a mass of oxide of iron, since it is probable that, on account of the constant pressure to which it is subjected, hollows could not be left in the mass.

On the other hand, the spirit of the present epoch is not as conservative as that of the past, and does not occupy itself with the indefinite conservation of things, because we know better than those before could have known, that the exigencies of progress, in its continuous necessity for new adaptations, demand less durability in modern processes. In reality, the formidable hardness of ancient structures, on account of the great labor of pulling them down, was more of a bane than a benefit to those who came after, as well as a profit to the industry of explosives.

Besides, studying the subject from the point of view of preservation, there is nothing disquieting, the remedy for which is not within the reach of modern science. If iron should not keep well in water, recourse to a covering of cement will preserve it.

Since reinforced concrete has come into general use, it has been noticed that iron remains unaltered in cement. After years the metal shows no vestige of oxidation, and preserves the bluish tint that it has when fresh from the milling machine, and there is no reason to believe that this preservation should not be indefinite, even in the case of submerged structures. The protection of cement must by force augment with time, as masonry of cement continues taking from the air or water new powers of durability and resistance.

Can there be a doubt of the practicability of preserving iron indefinitely under any circumstances, since Nature has shown us its numerous resources in the case of the preservation, in the ruins of Pompeii, deep under a layer of ashes, fresh and intact for many centuries, not only the unstable human organism, but even the transient and fleeting expressions of the anguish of death preserved upon the faces of those there buried?

In conclusion, the writers present the following summary of their views upon this subject:

First.—There is no practical experience as to the indefinite preservation of iron in water.

Second.—By reasoning, it seems evident that iron will be preserved in the water of foundations without special preparation.

Third.—There seems no reason for worry about an indefinite preservation of this material. It need only be preserved within time limits which are governed by the growing necessities of readaptation by modern progress.

Fourth.—That if it were deemed advisable to preserve iron indefinitely in foundations, it is possible to do this by having recourse to science.

Viollet-le-Duc: A Revival

THE preparations are in progress in Paris for the Autumn Salon, which may now be considered as an institution like the Summer Salon, says the London *Architect*. One interesting experiment will be made in it, for it will contain a collection of drawings and sketches by Viollet-le-Duc. Will they be attractive? which is a quality most desired by people who attend exhibitions. In all lands architecture is "caviare to the general;" and besides Viollet-le-Duc has been dead since 1879. The fame of many of the painters and sculptors who were his contemporaries has declined, and it would be difficult to discover anything in Viollet-le-Duc beyond his cleverness as an artist by which a new generation of the public could praise him.

There are, on the other hand, grounds for a prejudice against him. He was more versatile than was generally imagined, and his services were in demand for some of the theatrical entertainments given at the Imperial Court. He was also one of the literary and artistic "intimes" who used to gather round the Princess Mathilde, and he was noted for his irreverence towards everything connected with the churches which he was engaged in restoring. Frenchmen are not always persistent in their opinions, but they occasionally display a desire for the virtue of consistency by abusing men who are not worse than the majority. Whether Viollet-le-Duc sufficiently atoned for his Imperialism by acting as a military engineer in the defence of Paris remains to be seen. He became an out-and-out Republican, to the amazement of those who imagined they knew him; and, incredible as it may appear, he was elected to represent the Faubourg Montmartre in the Municipal Council of Paris. It is to be hoped that after nearly thirty years all the old animosities have been forgotten and admiration will be given to the drawings and designs of Viollet-le-Duc, and that his memory will be considered as worthy of being classed amongst the great men of France, to whom Frenchmen are supposed to be willing to always render homage.

Although he was the son of an official and held official positions during the greater part of his life, it is remarkable that Viollet-le-Duc was not brought up under that official system which is held to be essential for every architect, painter and sculptor who desires to succeed. He was born in 1814, and was the son of an esteemed and scholarly official connected with the

Department of Historic Monuments. He became a pupil of Achille Leclère. He does not appear to have spent a week in the École des Beaux-Arts, and that fact may help to explain the refusal of the students to accept him as a professor in 1863. His delightful draughtsmanship must have been early displayed, and from Leclère's atelier he went to study old buildings in the South of France, Italy and elsewhere. To some extent he might therefore claim that he was his own teacher. But although he exemplified the advantages of that method, he also suggested its drawbacks. All through his life Viollet-le-Duc regarded himself as a superior person. As Fate would have it, he was the nephew of old Delecluze, who was a pupil of David's, but whose paintings were not successful, and who became the lawgiver on art in the *Journal des Débats*. His conversation was ultra-Voltairian, though he allowed he was surpassed in that respect by his nephew. Much of Viollet-le-Duc's education was derived from his uncle, especially as regards all matters relating to philosophy and religion. The nephew was not to be restrained, and went beyond the old revolutionist's doctrines. In course of time the comic spectacle was presented of Delecluze as a matter of duty publishing two articles against the dangerous theories of architecture which his nephew announced. Yet he could not forbear impressing on people that he had something to do with the new heresy and saying: "C'est pourtant là un œuf que j'ai couvé."

In 1840 Viollet-le-Duc was back again in Paris from his travels, and owing no doubt to the influence of his father, who was one of the first men in France to promote the study of early French writers and whose catalogue of his own library is precious to bibliophiles, he was appointed inspector of works under Lassus and Duban at La Sainte-Chapelle—a building with which he was connected during the remainder of his career. The position he obtained was usually reserved for students who had returned from residence in Rome. But favor can make exceptions in Paris as in other places. Many other restorations under him followed, and Viollet-le-Duc in 1853 was considered to be so well acquainted with Mediæval architecture and restoration that he was appointed one of the three inspectors-general of churches in France. He was also entrusted with the restoration of the cité of Carcassone and château of Pierrefonds.

If Viollet-le-Duc's drawings were confined to those required for the official restorations they could hardly be expected to be adequate to constitute a section of a public exhibition. But in 1853 he commenced the publication of his great *"Dictionnaire de l'Architecture Française,"* which took several years to complete, and in the next year the *"Dictionnaire du Mobilier Française"* and *"L'Architecture Militaire du Moyen Age."* His perspective sketches are marvelous. While they were evidently intended to be diagrams in a technical book and there is no sacrifice of lines to picturesqueness, they have a finesse which was novel in the art of illustration. The lines might have been drawn with a needle, yet they are firm and precise, and the small figures introduced recall stained-glass windows. How a man could write such large works and make so many drawings for them with his own hand, besides carrying out his onerous duties, must surprise ordinary men, and is evidence not only of wonderful power which had been rigidly disciplined, but of an orderliness in the execution of work which might rival machinery. The pencil, we are told, can speak the tongue of every land, and the countless woodcuts in Viollet-le-Duc's volumes can be appreciated more or less by those who are without much architectural knowledge. But we fear if the original drawings are exhibited in the Grand Palais they will be found to be too delicate to satisfy a crowd.

In 1863 he was appointed Professor of the History of Art and Esthetics in the École des Beaux-Arts. It required courage to select him. A man who drew so definitely could not fail to possess decided views, and it was easy to anticipate that he would be in favor of a return to Mediæval ways. He belonged to the Romantic School, who considered independence to be essential for an artist, and architecture of the Gothic type offered far greater scope for liberty than was to be found in an adherence to the Classic orders. The existence of the Académie des Beaux-Arts was in itself a fetter on originality, and we may therefore be sure that the potentates who belonged to it did not altogether disapprove of the rebellion of the students. About Viollet-le-Duc's excellence as a draughtsman, although his work was always on a small scale and mainly architectural, there could be no doubt. It was as an expert he condemned the academic system, which made drawings from lithographs or other prints compulsory. He made no secret of his opposition to the whole established process, which appeared to be intended for the creation of embryo Academicians.

He had decided opinions about successful art. He looked on it as the slave of fashion, and considered a term of about twenty years was the duration of a reputation. It is to be hoped that law will not apply to his own works. Architecture he considered too should be an expression of the age in which it was produced. He denied that it was possible in the nineteenth century for people to express themselves either in the style of the Greeks or of the Frenchmen of the Middle Ages. With such a belief he could not be happy in the production of his own designs. William Burges publicly declared Viollet-le-Duc was no architect—that he was simply an archæologist, and it remains to be seen whether any of his original designs will find favor with Parisians. They have to suffer from one evil. It was known he was not a believer, and he may therefore be looked upon as the representative of a state of things which was brought forward as one of the reasons for the separation of the State from the Church. Some of the views may also excite pity. For if churches and cathedrals are to be converted into municipal institutions for secular purposes or left as mere relics of antiquity, where was the use of so much labor and expense in restoring them?

It is possible that the drawings made by Viollet-le-Duc as an amateur military engineer during the siege of Paris will arouse greater interest than his ecclesiastical drawings. It would appear as if a new era was opened to him with the Republic. He entered with earnestness into plans for the improvement of Paris. And as at one time he wished to have every niche with a statue in it, or, as he said, a paraquet for each cage, so he was eager to multiply the statues of Paris. It was at his suggestion that the Exhibition of 1878 was divided between the Trocadéro and the Champ de Mars. The latter is now again about to be cleared, and the halls of the Trocadéro palace are desolate. His sudden death at his country residence near Lausanne put an end to his amazing activity. Modern Frenchmen should recognize the similarity between Viollet-le-Duc and themselves. In him the laws of heredity were exemplified. His father preferred the poetry which appeared in France prior to the sixteenth century to all later works. The son, being more of a man of science, preferred the ancient buildings. On his mother's side he inherited the irreligious spirit which preceded the first Revolution. He could not fail to imbibe from the men around him the doctrine that an artist should follow art for the sake of art, and should be glad to display his power in a mosque or in a cathedral. These diverse influences will explain the peculiarity not only of his work but of his life.

The Public Statue[1]

OF course everybody likes a hero, and it is nice and elevating to see him emerge from the dead level of his fellow-men until he becomes Great, but even one's commendable and unselfish satisfaction is likely to be damped when one realizes the inevitable result. Either before or after he is dead, some busy-body of a philanthropist, or some time-serving County Council, will have him done in stone or bronze, and he will be erected in a special place where he will never again be seen except by infants in "prams" and their attendant nurses, or placed where he is dreadfully in the way. It is not that our Northern climate does not encourage heroes—far from it—but it has a very awful effect on their statues. The coal in London, for example, has ever been antagonistic to stone. Bronze, except that the hero usually turns pea-green, is more likely to survive the playful attacks of the weather. But, for instance, take a stone hero in whom the County Council shows but a languid

[1]Extracts from an article by Mrs. Lane in the "Fortnightly Review" for September.

interest, and it is painful to observe the havoc which our variegated weather, combined with coal-dust, can play with the most heroic features. The Misguided Fellow Citizen presents the marble effigy of the Great to his fellow townspeople, and he is permanently immortalized on the pedestal as "presented by our public-spirited townsman, M. F. C., Esq." Probably he and the man who scrubs it once a year are the only two human beings who ever look at the great man, and it is more than sure that M. F. C., Esq., never looks higher than the pedestal. The ordinary run of statues, unless they are royal, have only one really pleasant and satisfactory day in their existence, and that is the day they are unveiled. If stone, on that day they are spotlessly clean; if bronze, they are nice and shiny. After that they are never clean or shiny again. It has to be the statue of a very exalted personage for the soot to be scraped off and to have its face washed once a year. The average hero has to be satisfied with being unveiled; after that no one takes any further interest in him. There is no attire more unbecoming to a statue than the dress of an ordinary citizen. A modern statue, with the exception of the face, is only a fashion-plate in bronze and woe be to the sculptor if he leaves off a button. Happy is the statue that can hide its faulty anatomy in the mantle of a Knight of the Garter. But, unfortunately, this is a privilege granted to but few. On the other hand, it is even worse when a harassed sculptor, yearning to free himself from the tyranny of clothes, flies off at a tangent and puts nothing, so to speak, but a sheet around his statue (which in life was, probably, a modest man carefully buttoned up), and so leaves him to the perplexed gaze of his fellow-citizens. One doesn't mind the old gods being lightly clad in a laurel-wreath or a thunderbolt; one has been brought up to think of them that way. But when one sees an elderly, if heroic, gentleman in a classic armchair, with nothing on but a bathing towel, in the very street where, probably, he used to saunter up and down in uniform and pig-tail, or knee-breeches and cocked-hat, one feels embarrassed and apologetic, as if one were intruding. . . . Our Northern climate, and its attendant evils, are death on statues in the open. Who will not agree with me who has ever wandered through London and happened on forgotten statues in forlorn vistas. Preferably these live in mouldy squares where sooty years have peacefully obliterated their features, and four-wheelers are usually anchored at their base. Sometimes, when lost in the city, one stumbles across a forgotten philanthropist in bronze who, still true to his principles, furnishes a temporary escape from motor-'buses and other death-dealing vehicles while he sits there splashed with rich London mud, and more than ever a philanthropist. . . .

The only statues that are really well off in London are those gallant gentlemen in Trafalgar Square surrounding Nelson on his mighty column guarded by his gigantic lions. But even these are less impressive as statues than as part of a magnificent architectural whole. Next to them the eminent men in Parliament Square are in luck, for not only are they in bronze, and shut in from the traffic, but three of them are fortunate enough to have on mantles. But, really, one's advice to a hero is—should his destiny be a statue—if you don't want to look ridiculous and be forgotten, get them to put you on top of a column. That is the only thing that will save you.

COMMUNICATION

THE "CONSULTING ARCHITECT" AND THE "GHOST."

To the Editors of the American Architect:

Dear Sirs:—Everything that the *American Architect* says is, of course, interesting, but, being one of the comparatively few "consulting architects" in this country, I was naturally more than usually interested in the extracts you gave, in your issue of September 28, from what an English journal had to say about American "consulting architects" being nothing more nor less than what the English call "ghosts." That our English cousins call us "ghosts" or even assert that we are but "employment agents little different from a domestic servants' registry office" is really of but slight importance to us. But, the article receiving such wide publicity through your intermediary in this country, there is some possibility of our own practising architects being impressed by those statements so that a grave injustice would be done us.

In my own practice—and I doubt if it differs much from that of any other consulting architect in the country—it is not merely a case, as our English friends seem to believe, of my turning the work entrusted to me over to various specialists as would an employment agent, "farming out the work," as it were, but of my actually and personally doing the designing, the artistic part of that commission and then having all the other branches, the structural work, plumbing, etc., done by specialists, true, but all conforming to the general scheme laid down, working harmoniously together and to the one end of supplying a perfect, well-balanced entity. A practising architect whose business would hardly justify him in maintaining a staff of high-priced specialists in every line, can thus secure, through the employment of one institution or "consulting architect" the temporary services of many specialists, all working conjointly and under the one guiding hand, for the best interests of his client and with the least trouble and expense to himself.

The English journal referred to seems to believe that there is something unethical about this and that "architecture requires an artist, and the responsibility for the architectural treatment should be acknowledged publicly." One would infer from that and the context that the moment a practising architect did not do *everything* about his plans himself he became unethical. If he employs a specialist in detail work, must he proclaim that fact to the world? Or, if he has his specifications for plumbing revised by a sanitary engineer, must he lose caste if he doesn't so state it upon a mural tablet in the building? And if he can employ one class of service where are you going to draw the line? Why can he not, if he feels at all dubious about it himself, employ someone to do the artistic part of the programme? As a matter of fact, is it not commendable of an architect if, after being selected by friends or business associates to carry on a building, he realizes that he is personally a bit shaky in the artistic line or has not had any great amount of experience of the special phase or character of the construction desired, he consults and in fact turns over the technical part of the programme to an institution he knows can do the whole thing better than he can himself? Is he not thus doing the very best he can for his client and thereby really performing the first and most important function of his profession?

The public certainly doesn't suffer by this vicarious performance, and I fail to see wherein the profession can be harmed. I can point out lots of worse sins committed by our practising brethren than the employment of a "consulting architect." Really, it is only the latter, the "ghost," who can possibly have any complaint to make, and that would be that other men are building up a reputation, a great name, largely through the skill of the aforesaid "ghost," though not at the latter's expense in any sense of the term.

Very truly yours,

F. W. Fitzpatrick, *Consulting Architect.*

ILLUSTRATIONS

HOUSE OF ANTHONY N. BRADY, ESQ., ALBANY, N. Y. MR. W. S. PROCTOR, ARCHITECT, PITTSBURGH, PA.

COLD-STORAGE PLANT AND POWER-HOUSE FOR THE MURPHY POWER CO., DETROIT, MICH. MESSRS. ROGERS & MACFARLANE, ARCHITECTS, DETROIT, MICH.: THREE PLATES.

CASINO AND BATHING-PAVILION FOR THE BOROUGH OF DEAL, N. J. MR. DAVID M. ACH, ARCHITECT, NEW YORK, N. Y.

The main building is of concrete with reinforced concrete floors; the sand and gravel used were taken from the beach near the site, the use of the beach sand causing, in this case, no efflorescence.

On the ground floor are the casino, music-hall and a general assembly-room. The second floor contains a theater and ballroom.

This building is connected with the swimming-pool by a cloistered passage, the floor of which is the roof of a tunnel which connects the pool and bath-houses with the ocean beach and makes it possible to pass to and from the dressing-rooms without passing through the casino or the public streets.

The swimming-pool is 125x50 feet with a depth of from 10 to 2 feet, which depth may be increased to from 12 to 4 feet by means of sluice-gates. The concrete sides and bottom are lined inside with blue enameled brick.

The pool is emptied by gravity and filled by two centrifugal pumps of 25-horsepower each, which can be operated either singly or in tandem. The inlet pipe is connected with the ocean and also with a filter box at the beach, thus making it possible to fill the pool with either natural or filtered sea-water at will. Water can be pumped at all stages of the tide.

HOUSE OF EDWARD T. COCKCROFT, EAST HAMPTON, L. I., N. Y. MESSRS. ALBRO & LINDEBERG, ARCHITECTS, NEW YORK, N. Y.: TWO PLATES.

The architects have attained a happy originality in the designing of this country home.

It is distinctly a summer residence, facing the East Hampton sand dunes and built on a quiet lane within sight and sound of the breakers.

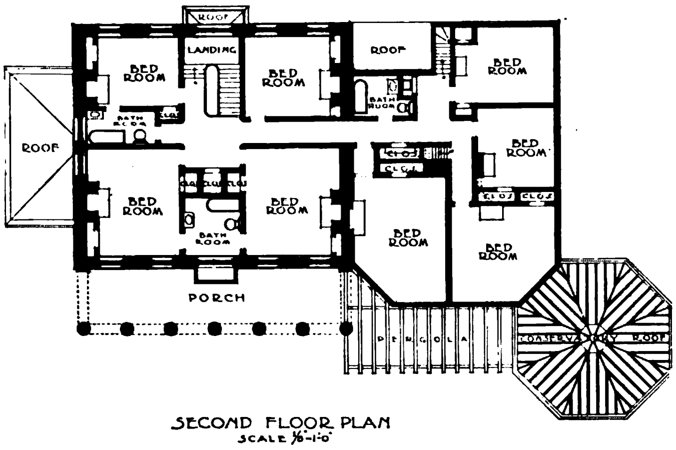
Cool by nature of its material; made restful in color by the blue water-green of its shutters and lattice, and the warm texture of the stucco on concrete walls; the careful and beautiful detail of the columns and pergola, and particularly the soft, thatch-like texture of the roof, all these things tend to give a distinct character that seems particularly suitable to a seashore home.

The plan of the house is simple in the extreme. Entering a large living-room, 24 feet by 40 feet, the dining-room opening off and raised a few steps, throws practically the whole first floor together.

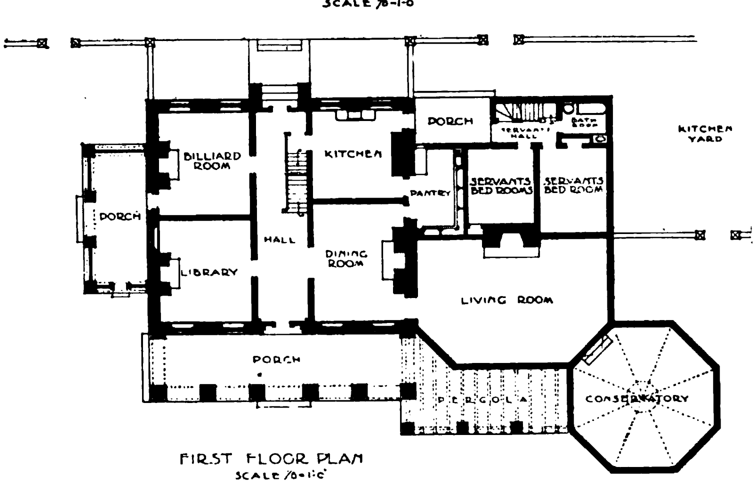
With the exception of a quiet room opening towards the west, and acting as a landing for the stairs, the first floor of the house comprises but these two fine rooms, excepting of course the servants' wing. The main part of the second floor contains six bedrooms and four baths, while the service wing provides accommodations for four servants.

HOUSE OF J. W. ELLIOTT, ESQ., EDGEWORTH, PA.

In our issue of September 21, 1907, we published some views of a "house at Sewickley, Pa.," the ownership and authorship of which were then unknown to us. Messrs. Rutan & Russell, architects, have been kind enough to send us the subjoined information about this interesting building, together with the floor plans.



SECOND FLOOR PLAN
SCALE 1/8"=1'-0"



FIRST FLOOR PLAN
SCALE 1/8"=1'-0"

The main square portion of this house indicated by the heavy walls of the plan was a stone house of the colonial type built over fifty years ago, and first used as a young ladies' seminary; it was afterward owned by Mr. Morrison Foster, brother of Stephen C. Foster, the composer, from whom Mr. Elliott purchased the property.

The entrance front of the house is within a very few feet of the street, the opposite front facing out on very spacious grounds; these grounds being secluded from the street by a brick wall along the street line and bordered by shrubbery on either side. The living-rooms of the house open out onto these grounds, from which the desirable view is had.

In treating the necessarily large addition to the original house the colonial feeling was sought to be retained as far as possible, the large two-story porch on the garden front being new.

Additional Illustrations in the International Edition.

VIEW FROM EAST: HOUSE OF EDWARD T. COCKCROFT, ESQ., EAST HAMPTON, LONG ISLAND, N. Y.

ENTRANCE FEATURE OF THE SAME HOUSE.

NOTES AND CLIPPINGS

THE CHAPEL OF THE PYX AS A CAMPO SANTO.—A notable suggestion has been made by the Dean of Westminster to adapt the Chapel of the Pyx for a burial-place, or Campo Santo. This could easily be done by breaking down the partitions which separate it from the eastern cloister, thus opening to view almost the only remaining portion of the original Norman abbey, built by Edward the Confessor, without vandalism—for the partitions are of no historical or architectural interest—and providing much-needed space for burial purposes. Originally a chapel, the Pyx chamber became the home of England's regalia from the reign of Edward I. until the time of the Commonwealth, and has since, until quite recently, housed the Pyx, or box containing the standard pieces of coinage. With the removal of this box to the Mint, the chamber has ceased to have a use, and the Dean's suggestion is therefore most opportune.—*Building News.*

THE ROYAL SARDINIAN CHAPEL, LONDON.—The curious little Roman Catholic chapel in Duke-street, which was established by the Sardinian Ambassador in 1648, and still goes by the name of the Royal Sardinian Chapel, is shortly to be destroyed. Everything about it speaks of the penal times. From the street the character of the plain brick building, with its round-headed windows, could hardly be guessed, and it was not until recent years that an announcement was put up on its exterior. In the time of the penal laws against Roman Catholics it was exempt as an Ambassador's private chapel, and to it came secretly members of the faith from all over London. The Gordon rioters visited it in 1778, and sacked the church and the Ambassador's house, to which the belongings of many of the threatened people had been removed for safety. The organ and the altarpiece, said to have been painted by Spagnoletti, were burnt, and the building was so much injured that it had to be largely rebuilt. As it stands to-day, the building has one of the most curious and interesting interiors among London churches. The little double-decked gallery is one of its quaintest features. On the Gospel side of the altar, the lower gallery—formerly styled the "Quality Gallery"—has a semicircular pew, where the Ambassador sat to hear mass. In the sanctuary still hang the two old wooden lamps made to resemble the silver one carried off by the Gordon mob. Another relic of that time is the strong iron chamber hidden behind the altar, in which the Sacrament is kept, the priest opening a little door in it over the altar by a secret spring. Very little of the old glories of its Sardinian days remain, except some beautiful vestments bearing the Sardinian arms. In 1902 some relics were discovered under the altar-stone, with a document which indicated that the stone had come from the old Abbey of Glastonbury. Up till 1857 the connection between the chapel and the kingdom of Sardinia was maintained; but when the King of Sardinia was excommunicated by the Pope, the prayer which had always been said for him was discontinued, and that for Queen Victoria was substituted. The subsidy from Sardinia was transferred, in consequence, to the Italian Church, at Hatton-garden. Victor Emanuel, however, had worshipped here in 1885, and was received at the entrance by Cardinal Wiseman. The late Pope, then Mgr. Pecci, during the time he was Nuncio at Brussels, visited this chapel and said mass.—*Building News.*

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The American Architect and Building News.

Vo.. XCII. SATURDAY, OCTOBER 26, 1907. No. 1661.

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NOTES AND CLIPPINGS .

OUR readers may recall that, a very weeks before San Francisco was overwhelmed by earthquake and fire, the city authorities there established the office of "Supervising Architect," it being the duty of the incumbent of the office to supervise the erection of all buildings erected for or by the city. For this performance of his duties he was to divide with the architect who actually prepared the design the 5 per cent. commission paid by the city in the ratio of two to three, and this in spite of the vehement protest of the San Francisco Chapter, A. I. A., the members of which felt themselves competent to supervise the erection of any buildings they might be called on to design, and did not take kindly to the idea of getting only 3 per cent. gross while the new official captured 2 per cent. net. Nevertheless, the ordinance was adopted and the former City Architect, Mr. W. D. Shea, who had until then been content to draw $4,000 in the way of a satisfying compensation, became the new Supervising Architect with a very elastic salary, quite unlikely soon to fall so low as four thousand dollars yearly, for at the time this ordinance was adopted the city had in contemplation so considerable an amount of work that the salary in question seemed likely to be between twenty and thirty thousand dollars. But the great catastrophe that followed a few weeks later seriously affected the city's building programme, as every one knows.

UNFORTUNATELY, perhaps, the great catastrophe, though it broke almost everything else, did not produce a fracture in the tables of the law; the ordinance establishing a Supervising Architect still remained in force, and Mr. Shea's appointment, which it must be remembered took place during the régime of Messrs. Schmitz and Ruef, held good. Who would actually have reaped the profit of this interesting arrangement if the earthquake had not intervened will never be known, and as, since the catastrophe, the city has been relatively rather inactive in the building line, Mr. Shea's income probably has not been as satisfactory as he hoped. Still, its size, or something else, seems to have been big enough to attract attention, for recently the Board of Supervisors have rescinded the ordinance establishing a monopolistic Supervising Architect, and have induced the Board of Public Works, with whom the power seems to rest, to re-establish the office of City Architect, with compensation fixed at $4,000, as before. How the members of the San Francisco Chapter will regard this belated yielding to their protests, we cannot say. But some of them are likely to regret that the old order of things is to be restored, for one of the effects of the change is expected to be the cancellation of the appointment of ten or a dozen architects who have been busily at work making drawings for school-houses.

THE terms of the ordinance re-establishing a City Architect are excellently conceived, for though that official is to look after repairs and alterations and is, moreover, to design such buildings as the Board of Supervisors may wish to entrust to his skill, the Board specifically reserves the right to procure by competition designs for any or all of the buildings the city may undertake to erect. As there are to be only two ways open to the city, to have its buildings designed by the official architect or else after designs procured in competition, it follows that the school-house work now in hand comes under the new rule and common fairness to the private architects who have been studying the problems requires that these buildings shall not be placed in the hands of the new official. But, seemingly, they must undergo the risks of a competition, with chances all in favor of their emerging winners from the trial, since they have doubtless been in constant consultation with the School Board and have reached solutions that satisfy.

WHILE San Francisco has been securing to herself once more the blessings that flow from the possession of an official arbiter of architectural taste, her nearly antipodal sister, Calcutta, has just taken contrary action and has abolished the post of City Architect, substituting for that functionary a board of four district engineers. One of the interesting things connected with this change is the fact that *Indian Engineering*, in place of applauding this acknowledgment of the capacity of the members of the profession which it serves, condemns the change in good set terms and points out that "both continuity and uniformity are sacrificed when the expert duties of one person are entrusted to four different and virtually inexpert hands." The fact that Calcutta is about to embark on a great and costly "improvement scheme," for which a competent architectural head will

be needed, makes the change all the more untimely—unless the explanation is to be found right here, and to have the possibility of appointing a competent architect to take charge of this important work it has been thought best to get rid of an official who could claim the place by right, but who was felt to be not exactly the man for the important work in sight.

THE new system adopted in San Francisco, essentially the same as that which has been in operation in Boston for some years, is so good that we should like to see similar limitations imposed on those who exercise the functions of State Architect, and New York, where Mr. Heins's regretted death has made a new appointment necessary, would be a very good place to begin. Governor Hughes has felt the place important enough to fill with unusual promptitude, but this does not imply lack of care or discrimination. Any of the four men known to be applicants for the place might have been appointed with entire safety, but we incline to think that the fact that Mr. Franklin B. Ware, the actual appointee, had a working knowledge of public affairs that the others lacked properly counted in his favor. During his four years' service as Alderman for the City of New York, Mr. Ware manifested on several occasions considerable independence, much good sense and a good grasp of what responsibility to the public really is. Professionally, Mr. Ware, who is but thirty-four years of age, acquired his education in the School of Architecture of Columbia University and in the office of his father, Mr. James E. Ware, where for several years he has been a junior partner, and where he has been brought in contact with work that in character and cost scales very fairly with that which he will have to handle as a public official.

IT should be well known by this time that we do not believe in the theory of employing men to act as municipal or State architects, if the theory is to be followed by practice and take outward form in the designing of all public buildings for such municipality or State by a single architect. In reaching our belief we are influenced by a careful consideration of what we feel to be the best interests of that part of the public concerned and the progress of the art of architecture. Feeling thus, it is quite interesting to us to find that a State Architect shares our feeling in part and is willing to go to unknown lengths in the supporting of his views, though, to be sure, he is influenced by quite other considerations than those which have influenced us. It is reported that Mr. W. C. Zimmerman, who was employed by the State of Illinois to act as its official architect on the distinct ground that such an official would save to the State the five per cent. commission paid to private architects, has recently refused to prepare drawings for the new physics laboratory for the University of Illinois, on the ground that remuneration at the rate of one and one-half per cent. was altogether inadequate. It is said, too, that Mr. Zimmerman declines to abdicate and is to endeavor to secure a change in the law.

WE have been asked to formulate our reasons for disliking and disbelieving in the system of employing official architects for State and municipal work, and this is an opportunity for recording some of them at least. At first sight, there seems to be no very obvious reason why a good man, a capable and honest architect, that is, cannot, as a public official, produce as satisfactory results as the same man is able to create when working as a private architect. Perhaps he really can, but the evidence seems to show that he does not, and yet one would guess that, enjoying an assured income and, so, being relieved from the feeling of anxiety that obsesses every man who has to strive to secure an uncertain income, the official genius would be in the best of positions to exert itself. The actual result seems to show that, very shortly, the official becomes used to his ease, grows unwilling to exert himself and becomes more and more a mere observer of routine; he becomes lethargic, while circumstances compel the private practitioner to keep himself alert and his faculties in the best of order. Of course, there is the primary objection that public bodies, from the National Government down, are not willing to pay the salaries that will secure architectural talent of the first or even the second order, and naturally, even with the best of luck, they can hope to secure only results that grade below the first and second classes. To be sure, now and then a man of ability is induced to serve on the condition that he be allowed to continue his private practice, to ride two horses, to serve two masters, that is. New York tried this and the result is that Mr. Heins was, in all probability, practically worried to death by the public clamor against the manner in which circumstances enabled him to discharge his public duties.

BUT an equally grave, perhaps a more potent, objection to the system is to be found in the tools the official architect is often obliged to use, the personnel that is to be found in his draughting-room. The private architect competent to do satisfactory public work does not keep drones and incapables on his pay-roll, it is not good business to do so, while the public official finds himself obliged to get what results he can from those draughtsmen who are forced upon him by the successful adroitness of pushing politicians. A silk purse cannot be made out of a sow's ear and it is hopeless to expect that such draughtsmen and designers as usually are to be found in public employ can turn out any better detail than the tawdry splendors that make the interiors of our public buildings so offensive to people of taste. Since the office of the Supervising Architect at Washington was brought under the protection of the Civil Service laws, draughtsmen and designers of real merit have been willing to remain in the service of the National Government for several years on end, and the good result is to be seen in the buildings that Mr. Taylor has to his credit. But the case is different with the offices of the usual State or municipal architect; here the spoilsman and the place-hunter find it easy to provide for the incapable protégés of "party" friends to whom they owe political debts. As the New York office, too, enjoys Civil Service protection, it is possible for Mr. Ware to emulate and perhaps parallel Mr. Taylor's success in securing competent assistants, and then by his treatment of them so encourage and foster their ambitions that they will put into their work the best that is in them.

The Royal Villa at Caserta

THERE are buildings whose architectonic merits are so knitted with their decorative qualities that one cannot speak of the first without drawing attention to the second. One of the Italian buildings that present this happy association is the Royal Villa at Caserta, and consequently its designer's name shines in the annals of Italian Art. Luigi Vanvitelli, painter and architect, belongs to the cohort of the builders of St. Peter's. He was born in 1700 and was entrusted with the building of the palace during the reign of the Bourbon Charles III. Vanvitelli had already given marked proof of his ability and this was the reason for his being selected for the great undertaking wherefor there was plenty of space and all the money that could be needed. And what better than this can an architect desire?

His scheme was laid before the King, who accepted it, and the first stone of the great villa was laid January 20, 1752, though the actual work on the building did not begin until the following June.

King Charles, however, could not see the end of the work, as in 1759 he became King of Spain and took up his residence in that country. He did see, however, the main story of the building completed. His son, and successor on the Neapolitan throne Ferdinand, not only interested himself in the completion of the building so happily begun, but, for his own part, conceived and established an undertaking which. though inferior to the Villa in magnificence, was more than its equal in practical usefulness. I refer to the celebrated Colony of San Leucio, the seat of the silk industry which during long years held the place of honor in Neapolitan life.

Caserta, which lies near Naples, was before the building of the Villa only a small place called La Torre, where there existed the baronial palace of the Counts of Caserta, together with the ruins of a still more ancient tower which gave its name to the place.

The Royal Villa, although impressive, was not intended to remain isolated. According to the plan of Charles III., it was to be but the capital feature of a new city designed by Vanvitelli. All the houses in this city, according to an old writer, were to be of the same height, a statement that is supported by a "*Dichiarazione dei Disegni*," published at Naples by Vanvitelli, in 1756. Whether the side of the present Caserta, or the side that was to be laid out beyond the Villa, was to have this symmetry, with the Villa in the middle rising above its neighbors, is not known, though the matter is, perhaps, of some little importance.

Some voices were raised in opposition to the scheme of Charles III., for it appears that the King used an enormous sum in building the Villa, which was to house, at odd times, the entire Court. But the King, if the city had been built, would have inhabited the Villa. Moreover, the work actualy carried out brought into the neighborhood such a vast quantity of water that the royal extravagances were largely justified by this fact alone. Formerly Caserta had an insufficient supply of water, not enough to enable the building of the Villa, and to its actual building is due the abundance of water we now find there feeding an infinite number of wells, fountains, brooks and ponds. Springs and sources of supply had to be sought and difficult and costly works of canalization had to be carried out by Vanvitelli, in the realization of which he had skilful colaborers, such as Francesco Collecini and Andrea Vici, who had as successor his son, Carlo. The hydraulic display explains why every one who visits Caserta is instantly reminded of Versailles. Even the Villa has a certain resemblance to the *"vieil Château"* of Louis XIII., enlarged in course of time and made magnificent as we now see it.

The times in which Vanvitelli lived were not given over to amplification and incontinence: the Barocco had passed and gone, the Rococo was waning, to give place to a Classicism which was to oppose a certain modesty of form to all the exuberance of the two preceding styles. So Vanvitelli laid out the Villa as became a votary of Palladio's or Vignola's. The T-square was the instrument preferred by Vanvitelli in preparing both plans and façades, of which the important feature is the common *motif* much repeated in those days by every honest architect who built with due observance of the proprieties, that is to say a high basement, a main story with its "order" of columns, and windows opening in the intercolumniations. Because of this the aspect of Caserta calls up Versailles and the names of Vanvitelli and Jules Hardoin Mansart are coupled, with a unanimity which one does not find equalled elsewhere in his studies.

Architecture should be hostile to universal formulas, and if there should ever be in use a common volapuk for speech there should be no architectural volapuk. Sameness breeds ennui, and is based on theories which do not give proper consideration to differences of time, climate and custom. Vanvitelli, then, creator of the Villa at Caserta, following the ideas of his day, leaned to the Classic side more than is quite acceptable to our unstable taste

to-day, and I think that this Roman architect, a born artist, found his conception rather dry food for his lively palate, for at Caserta he seems less personal than we should probably have found him if by chance he had lived half a century earlier.

It is the style of the lapidarist that Vanvitelli adopted, especially for his façades. Nevertheless, those who are pleased with effects produced by great dimensions, those who are content with beauty resulting from the use of motives adopted with profound science and are not greatly interested in originality, will find much to please them at Caserta. To see a basement *motif,* with columns and windows, cornices, balconies and statues many times repeated; to see a building with its four stories chillily aligned as if so much infantry; to see all this in the placidity of an inflexible horizontality produces an impression of mild enjoyment, and the spirit, if it does not exactly swell, conceives for the subject a certain respect.

The interior of the Villa creates a profound impression, especially when one comes upon the main staircase, the *"scala regia,"* which is found in one of the arms of the cross, for the building is so planned as to enclose four courts, the enclosing rooms opening on the exterior as well as on the courts. The staircase consists of two runs enriched by an order of Doric columns, while a magnificent octagonal vestibule closes the vista at the end of the ramps. I do not know in all Italy a staircase so superb as is this at Caserta; it is the chef d'œuvre of our staircases, and we do have some that are remarkably fine, especially in Rome, Genoa, Cremona and Mantua; but in general these are but pale simulacra, compared with this one at Caserta. It consists of one hundred and seventeen steps, the greater part of which are cut from a single block of lumachelle or "fire-marble" and decorated with colored marbles, all coming from the ancient kingdom of Naples, such as the yelow marble from Mondragone, the breccia from Tripalda, and stones from Montevirgine, Vitulano and S. Angelo di Puglia, which are united with white marble and the *"bardiglio"* from Carrara in the composition of pilasters, pedestals, cornices and in the mouldings, great and small, which surround the frescos and ornamental bas-reliefs.

The artists who executed this staircase were many in number but enjoy no especial fame, for the reason, perhaps, that up to the present time the history of the decorative arts has not been much studied. When the time does come for preparing a thorough history of these arts, the Villa at Caserta can furnish a legion of marble-workers, sculptors and painters deserving recognition. Tommaso Solari and Paolo Persico carved the great lions couched at the foot of the ramps, while sundry trophies were carved by Andrea Morosini; the statues also are due, some to the same Solari, others to Andrea Violani and Gaetano Salomone. The paintings are the work of Gerolamo Starace.

The visitor who seeks lasting impressions must turn to the chapel, erected after very much the same plan as the chapel at Versailles, but surpassing it in richness and the beauty of its proportions. The marbles used for the staircase are introduced here again, in conjunction with yellow Sicilian marble and verde antique. The columns, isolated, play a very important rôle in this little masterpiece which is ceiled with a caissoned barrel-vault, covered with gold-leaf, in the style of the rest of the Villa. Caissons are obligatory in the Classic style, if one has to deny himself mural painting, and gold is generally required by architects who have a mastery of the style. Another notable feature of the Villa is the theatre, to the west of the staircase and on the same axis; its façade fronting on one of long sides of the palace. It follows the normal lines in its arrangement and can accommodate several hundred persons distributed over the parterre and the five stories of boxes, to say nothing of the royal box. Twelve verde antique columns enrich the auditorium, which has the individual charm of having its floor on the same level with the stage. Gold and color here, also, play their genial rôle, as everywhere else throughout the great building.

To make the complete round of the Villa would take long and a full description would carry one beyond allowable limits;

nor would it be possible to avoid repetition, since variety in architectural and decorative effort is not exactly the strong point of the Villa of Caserta. The edifice was long in building, and even the first decade of the last century saw architects and decorators still at work on the royal apartments; but in spite of this long term of effort we do not find the great variety of taste that is sometimes noticed elsewhere.

From the chapel, across the vestibule and to the south, open the royal apartments with their two halls, known as the Garde de Corps and the Hall of the Halberdiers. A third hall, at the left of which is found the apartment called "the old," to distinguish it from that on the right which is known as "the new," is embellished with a fresco, "Alexander, the Macedonian," which covers the vault and does honor to Mariano Rossi (1807), a Sicilian painter. This Rossi is one of the most notable of the painters employed in decorating the palace; at Caserta he is as full of force and imagination as he was at Rome where, in the Villa Borghese, he painted a ceiling that I would class amongst the finest ceilings of the time, whether at Rome, Naples, Genoa, Turin, Venaria Reale, Stupinigi or Rivoli.

The so-called old apartment at Caserta has a smiling elegance of its own, the walls lined with a rich tissue woven at San Leucio, the industrial colony I have mentioned already, covered with exquisite ceilings and decorated with delicate stucco-work and great mirrors, according to the Italian taste of the day. It was finished about 1780 and was at once called the old to distinguish it from the newer rooms, for it was not Vanvitelli's intention that these should be the royal apartments: they were actually intended for the royal princes. On the new apartments many brushes were employed. Antonio Dominici and Fedele Fischietti painted there "The Seasons," with an abundance of *putti*, garlands and images of the gods of other times: Bacchus, Mars and Saturn find themselves in company with Justice, Abundance and Splendor in these rooms, which are really noble in their air. I must not halt to speak of the canvases on the walls or the furniture in which the whole building is rich, so much so that anyone who designed to make a study of the decorative arts in the time of Vanvitelli would find here an abundance of useful "documents."

In one of the rooms the architect arranged under the cornices the drawings for the Villa, and this exposition does the architect the greatest honor, for they show that he had a very unusual sense of grandeur.

It is the frescos, however, that give the most pleasure, for their authors show themselves to have been most lovable artists whose rich and brilliant palettes at times succeed in obscuring imperfections and weaknesses in their work.

Architects and decorators ought to visit Caserta, and it would indeed be unpardonable for one finding himself at Naples not to make a trip to the Villa Reale, which is henceforward to assume the character of a museum. But the Villa of Caserta presents itself to visitors in no sense as a "prison of the arts," but rather as a veritable habitation with all its warmth. It is hardly necessary to say that the building is not actually inhabited, but everything stands arranged so that guests, whether royal or not, might feel themselves instantly at home. The furniture stands in its proper place about the rooms and along the walls, some of it in the Rococo style, some in the Empire style, and as examples of the latter, which alone deserve a visit, may be mentioned the beds of Gioacchino Murat and Maria Cristina.

The "new apartment" deserves attention because of two halls known respectively as the halls of Mars and Astræa, the noblest, perhaps, in the building. The Hall of Mars contains a red granite chimney-piece, several bas-reliefs of Valerio Villareale, Claudio Monte and Filippo Rega, and a frescoed ceiling, "Mars in a Car of Triumph," by Antonio Galliano. The Hall of Astræa, with its pilasters of imitation porphyry, its bas-reliefs, modelled by Villareale and Domenico Masucci, and its frescoed ceiling, whereon Domenico Berger depicted "The Trimuph of Justice," is also of much interest. The work here was carried out in more recent times, for the decoration was conceived early in the nineteenth century by the architect Pietro Bianchi, and further, about 1830, the painter Giuseppi Cammarano, decorated the Council Hall and other rooms.

The Villa Caserta owes much to the park which surrounds it. Issuing from the Villa by the north entrance we have the woods on the left, the "old forest," so called, because it remains in much the same state in which it was left by the last Prince of

Caserta, Andrea Matteo Acquaviva. The writers of his day spoke of it with high praise, and in fact it abounds in fine avenues and alleyways bordered with oaks, laurels and maples hundreds of years old, up whose trunks from beds of green sward creep ivies of many varieties. In 1769 the architect Collecini built a reservoir for a fish-pond, and later the Bourbons caused another wood to be planted on the right-hand; this stretches out towards the grand cascade, a very marvel, a dream, a vision of beauty. On

the north side of this wood lies the "English Garden," begun in 1782, by Queen Maria Carolina, of Austria, wife of Ferdinand, who summoned the Englishman Græfer to design and plant it. It appears that he was ordered to equal the display at Versailles and he selected the site, distributed the water, planted a botanical garden and provided for all sorts of hydraulic displays, introducing rivers, lakes, brooks and fountains. Oh! the fountains of Caserta! The first of these that one meets is that of the dolphins, the second is that of Eolus, the third that of Ceres, the fourth is dedicated to Venus and Adonis, while the last immortalizes Acteon. Over an inclined way broken by many steps we reach at length a grotto, from the top of which can be had a marvelous view of the grand cascade. The water hurries along, falling picturesquely here, spreading out there under veils of white mist or piling banks of foam amongst and against the architectural embellishments, producing in all a most enchanting

picture. From the same standpoint we have a wide view over the lands of the Campagna, while nearer at hand shines amongst its green lawns cut here and there by water-courses the Villa itself, a view that will long linger in the memory.

My American readers will do well not to forget the Royal Villa at Caserta and its park which holds a place high in the list of successful pieces of landscape architecture, whether in Italy or elsewhere.

ALFREDO MELANI.

The Plaza Hotel

THIS addition to New York's expensive and luxurious hotels faces the Plaza at the southeastern entrance to Central Park, at the junction of Fifth Avenue and Fifty-ninth Street. The architect is Mr. H. J. Hardenbergh, who designed the Waldorf-Astoria, the Manhattan and other well-known hotels in New York and elsewhere, and is therefore already famous as a designer of buildings of this class.

It was the original plan to build an extension to the hotel of the same name, formerly occupying this site, reinforcing the building with steel construction and carrying it up five stories more. It was believed that there was a subterranean stream running under the foundation and that it would be necessary to erect the proposed addition on piles. At a depth of some forty feet, however, solid rock was found, and all worry as to the possibility of securing a satisfactory foundation for the structure to be erected was at an end. It was then decided to demolish the old building entirely and raise the present splendid structure on the site.

The new building is of a steel frame construction, with hollow tile floors. All stairways and elevator shafts are enclosed with wire-glass, and all woodwork is fireproofed. The occupants are thus practically insured against danger from fire.

The exterior walls of the lower three stories are of marble, and from the entablature of the third story to the cornice of the mansard roof the building is veneered with glazed terra cotta of a cream white color, harmonizing well with the marble below it and the moss-green color of the roof above the cornice of the twelfth floor. The gable ends in the mansard are connected by colonnades on all sides, while the roof line above the dormer windows has been designed to indicate the existence of an open court. There is no provision for a roof garden; the lofty tea room on the main floor with its spreading palms and tropical plants supplying in some measure this now common feature, while the open plaza and the lawns and wooded slopes of Central Park provide plenty of restful green for those who are fortunate enough to have a view from the windows on the north and east.

In giving titles to our plate illustrations the mistake was made of calling the room marked "Bar-Room" on the plan the "Café," and the "Café" proper was entitled "Grill Room." The actual position of the grill room is in the basement immediately beneath the café.

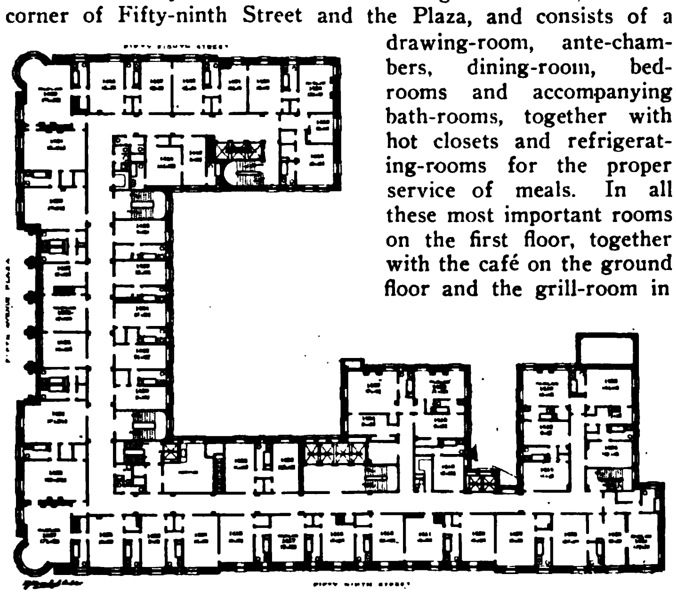
The main entrance to the hotel is through the foyer on the Fifty-ninth Street side, facing which are the elevators, which are placed so that they are easy of access and entirely under the eye of the office. This foyer is finished in Italian marble selected and imported for this purpose. At the left of the foyer is the café, a most interesting room. This is Spanish Renaissance in style, with a wooden ceiling supported by characteristic brackets, all elaborately carved, stained and fireproofed. The door trim is of Caen stone. The tapestries which hang on the wall were designed for this room, and were executed in Europe.

At the end of the main corridor and at the rear of the office is the bar-room, the style of which is German Renaissance. The wood-work of this room is all of oak. An attractive feature of the ground floor is the tea-room opposite the Plaza restaurant on the main corridor, the walls of which are entirely of Caen stone and plate glass, with columns of Fleur de Pêche marble. The capitals for these columns and the metal mouldings and wreaths used on this floor were made by the Winslow Bros. Company of solid bronze. Four caryatides on the west wall support arches, which frame large mirror panels. Messrs. Pottier & Stymus, who furnished these caryatides, inform us that they are copied from originals in the Pisani palace in Carrara, which are said to be the work of Donato Donati, pupil of Michael Angelo. They typify the four seasons.

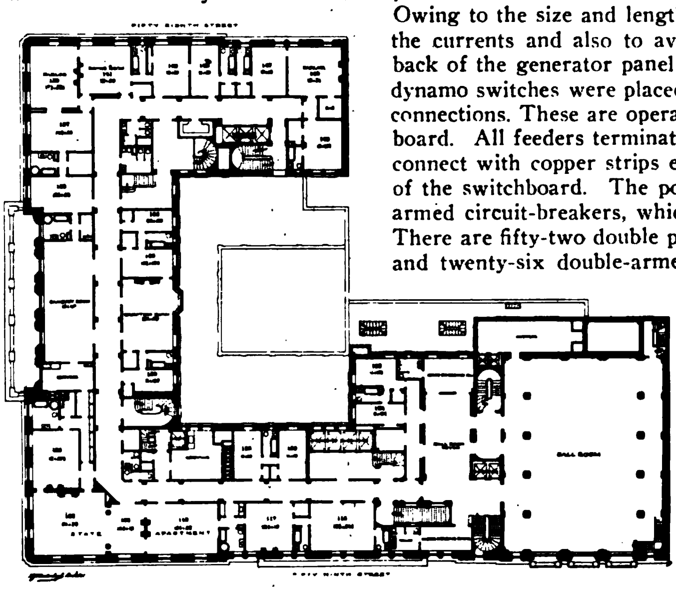
There are two dining-rooms or restaurants on this main floor, one for permanent guests and one for transient use. The tone of color of these rooms is warm and attractive. Windows and glazed door openings are separated by broad pilasters, each bearing a mirrored panel with open work metal applied on the glass surface. The decorations in these rooms and also in the bar-room were carried out by Messrs. L. Alavoine & Co.

The first floor contains in addition to a number of sleeping chambers a ball-room, a banqueting-room, and state apartments, together with a special suite on the corner of Fifty-ninth Street and the Plaza. The ball-room is Louis XV in its decorative treatment, and has special staircases, entrances and elevators, all entirely enclosed and protected as previously described. A novel feature of this room is the movable stage or balcony. This when elevated forms the southern end of the gallery, and when lowered to the floor can be used as a stage for theatrical and similar purposes. It is raised and lowered by four cables which wind around drums located in the space beneath the stage flooring, and all controlled by an electric motor. This room can comfortably seat six hundred persons. It is lighted by electroliers suspended from the ceiling, arranged along the balcony edge and the side walls beneath the balcony. The state apartment, which has be-

come a necessary feature in the modern high-class hotel, is at the corner of Fifty-ninth Street and the Plaza, and consists of a drawing-room, ante-chambers, dining-room, bedrooms and accompanying bath-rooms, together with hot closets and refrigerating-rooms for the proper service of meals. In all these most important rooms on the first floor, together with the café on the ground floor and the grill-room in the basement, the decorations were carried out by Messrs. Wm. Baumgarten & Co., who also decorated in oil colors, painted on the wall covering called "Decora," a large number of the guest rooms.



The floors above follow the typical arrangement shown in the plan which is here published.



A very complete pneumatic equipment for distributing documentary matter has been installed by the Miles Pneumatic Tube Co. The system is so arranged as to cover three separate duties. One set of tubes connects the main office with a branch office on each floor and conveys such things as letters, telegrams, visitors' cards or even small parcels. Another set of tubes transmits the orders of the guests from a serving pantry on each floor direct to the kitchen. The third set provides for communication between the heads of the various departments through the main office. A clock, which is regulated by the Magneta system from the office, is provided for each room.

The mechanical plant, which is located in the sub-basement, is probably the largest and most complete isolated plant in New York City. The engine and boiler-room, as well as the laundry walls, are lined with white enameled brick. The flooring is of six-inch square white tiling. Steam for all purposes is supplied by nine Babcock & Wilcox water-tube boilers having a total capacity of 3,500 horse-power. The working pressure carried is 135 pounds. Each boiler is equipped with Wilkinson automatic stokers, steam jet blowers, two safety-valve injectors and a Hubnor & Mayer's double-acting combination-stop and isolating-valve, which automatically stops the flow of steam in case of an accident to the boilers or steam piping.

It was necessary to remove a residence on Fifty-eighth Street to provide a coal-receiving and storage plant, with a capacity of about 750 tons. Coal is received in a weighing hopper, weighed and conveyed to the storage-rooms and boilers by a C. W. Hunt Company's steam-driven conveyor. Ashes from the boiler are removed in a similar manner. In addition to the injectors on the boilers four "Admiralty pattern" Worthington boiler feed-pumps supply water through a Goubert heater to the boilers.

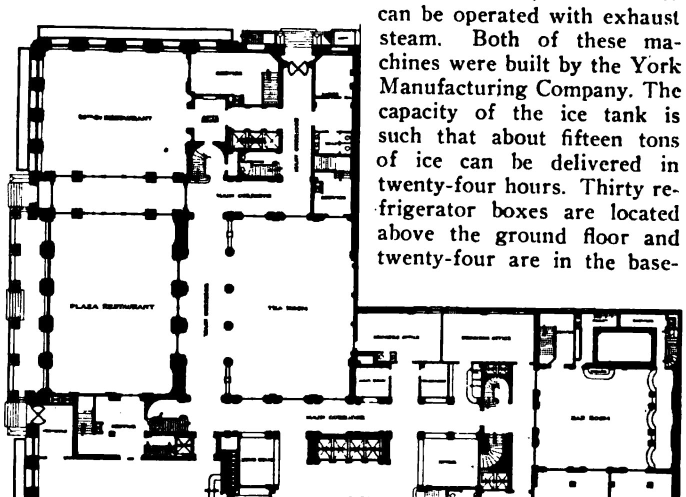
The exhaust steam is utilized for heating water and warming the building. This steam flows through an 18-inch pipe to a receiver, from which it is distributed to seventy-nine risers connecting with radiators throughout the building. The heat at the radiator is controlled by a Johnson's thermostat valve, which maintains an even temperature in the rooms. The returns from the heating system are handled by the Webster system.

The ventilating system devised for this building is probably the most elaborate ever installed. Four hundred tons of galvanized sheet-metal were used in its construction. The fourteen Sturtevant ventilating fans are electrically operated by eleven C & C motors, generating a total of 250 horse-power.

The electric current supply of the building is derived from a generating plant of 1,100 K.W. capacity. There are four units, one of 400 K.W., one of 300 K.W., and two 200 K.W. The generators are 115-volt, direct-current, compound-wound machines, and were built by the Westinghouse Company. Each unit is direct-driven by a simple Corliss engine built by the Allis-Chalmers Company. These engines are equipped with the usual safety appliances, and in addition there is an auxiliary governor which stops the flow of steam to the engine in case of excessive steam supply. The engines are run non-condensing at 135 pounds initial pressure and no back-pressure.

An automatic gravity oiling system furnishes oil for lubrication to the engine and dynamo bearings. All of the generator and feeder circuits for lighting and power throughout the building are controlled at the main switch-board in the engine-room. This switch-board is 42 feet long and 8 feet high, is made of gray Tennessee marble, and has one feeder panel and one instrument panel on each end, the four generator panels being in the center. Owing to the size and length of dyramo leads required to convey the currents and also to avoid complicated bus-bar work on the back of the generator panel of the switchboard, special automatic dynamo switches were placed near the generators for the equalizer connections. These are operated electrically from the main switch-board. All feeders terminate near the top of the switchboard, and connect with copper strips extended from the bus-bars to the top of the switchboard. The power feeders are connected to double-armed circuit-breakers, which also serve the purpose of switches. There are fifty-two double pole knife switches for lighting feeders and twenty-six double-armed circuit-breakers for power feeders mounted on the feeder panels. The fuses for all feeders are placed on the back of the switchboard.

The refrigerating plant consists of one 100-ton compression machine and one 100-ton absorption machine, the object being to operate the absorption machine during the winter months and the compression machine in the summer. Either machine has ample capacity to supply the building with ice and refrigeration. The compression machine is direct-driven by a 75-horsepower cross-compound Corliss engine. The compressors are single-acting. The absorption machine can be operated with exhaust steam. Both of these machines were built by the York Manufacturing Company. The capacity of the ice tank is such that about fifteen tons of ice can be delivered in twenty-four hours. Thirty refrigerator boxes are located above the ground floor and twenty-four are in the basement and sub-basement. These boxes are of steel, cork and glass, and practically indestructible, and as near being a



sanitary box as could be devised. They were installed by the Lorillard Refrigerator Company. On the seventeenth floor is a refrigerating room for the storage of furs, tapestry, blankets, etc. This room, as are also the refrigerating boxes, is cooled by brine circulation. The refrigerator-room is thoroughly insulated from the building, and is ventilated by a 5 by 10-foot shaft to the atmosphere. In case of accident to the refrigerating machinery it is not possible for the ammonia fumes to penetrate any part of the building.

The elevators, which were made by the Standard Plunger Elevator Company, consist of ten passenger cars, three sidewalk lifts, and thirteen electric dumbwaiters. Every known appliance to prevent accidents has been installed. It is impossible for the operator to start the car before the door is closed, nor can the door be opened before the car is level with the floor and at rest. The hydraulic power for these elevators is supplied by two Laidlaw-Dunn-Gordon tandem compound pumps and one three-cylinder compound crank and flywheel high-duty pump. Water for the building is obtained from the city supply through two mains. This water is filtered through ten Loomis-Manning filters, having a capacity of 1,500,000 gallons a day. The water for drinking and culinary purposes is again filtered through a Buhring filter. For fire purposes the water is pumped to storage tanks on the eighteenth floor. These tanks have a capacity of 75,000 gallons. The pumping plant is so constructed that, if necessary, 4,000 gallons per minute can be pumped through the fire-lines and to the storage tank. A vacuum cleaning system operated by two steam-driven pumps has been installed. In addition to the laundry in the basement, which has a complete equipment, there is also a "bundle" laundry on the eighteenth floor. All laundry machinery is operated by electric motors. The illuminating system throughout the building has been designed in the most artistic and lavish manner, and there are about 17,000 incandescent lights.

There is a long-distance telephone in each room and also a push-button service connecting with annunciators on each floor, as well as with the office.

The kitchen, installed by the Duparquet, Huot, Moneuse Company, is in close proximity to the service stairway, entrances, and dumbwaiters, and readily accessible to every point of service. It is so arranged that every feature is under the direct control of the chef, and at all times within his view. The objectionable features in the preparation of food are confined to certain limits and screened by wire partitions.

ILLUSTRATIONS

THE PLAZA HOTEL, NEW YORK, N. Y. MR. H. J. HARDENBERGH, ARCHITECT.

The thirteen full pages of plates in this issue are devoted to illustrations of this building. A written description will be found on the preceding pages.

NOTES AND CLIPPINGS

ROMAN MOSAIC.—Rio maintains there was an Early Roman school of mosaicists which produced works better adapted for church decoration than those by the Byzantines. The Greek artists, he said, dazzled the eye with gold grounds which often covered very large surfaces, on which appeared drawn, with more or less skill, the comparatively pale figure of the Redeemer. The throne of God and that of the Virgin were covered by them with gilding and as early as the tenth century this profusion of ornament in gold is already observable in their manuscripts and miniatures. In the mosaics of the Romano-Christian school the grounds are almost always white; or, if gold is sometimes employed, it is only to mark the luminous points in the clouds and draperies. If to this we join the singular predilection of the Greeks for long and meagre figures, and the common character which marks the heads of their saints, generally void of expression, we shall have recapitulated the most characteristic features of Byzantine art in the period in question.

So many critics have given the preference to Byzantine mosaics, it is well to find something said in favor of the Roman work. But we are less likely to see the latter in their pristine state than those by foreign artists. Rome was subject to invasion, to rebellions of the citizens and other dangers in which the churches suffered. It has also been stated that mosaics were altered, and the original countenances of saints removed in order that portraits of living patrons might be substituted. The churches must also have had a staff of workmen who followed no particular trade or art, but were willing to attempt all kinds of tasks. In that way the mechanical treatment which is sometimes to be observed can be explained. Byzantine artists or their descendants were not likely to be employed unless they had acquired a reputation for skill. They also accepted limitations for their art, and may have depended as much on recollection as on their inventive power. Consequently they preserved traditions for a much longer time than Roman and Italian workmen, although their figures lack the vigor which we see in those of the Zuccati in Venice with such a designer as Titian. The older examples have a quaintness which always must be considered attractive. Nevertheless it does not follow that for modern works Byzantine imitations are indispensable. Similar simplicity can be attained in other ways.—*The Architect.*

DECORATING STATION WAITING-ROOMS.—The Danish government has voted 15,000 crowns for decorating the stations of the State railways artistically. The sum is not large, but the experiment of using these stations as a medium of popular artistic culture will be watched with interest elsewhere. A new periodical, specially devoted to the cause of beautifying Germany, the *Schwäbische Heimat*, suggests that the government of that country should follow the example of Denmark on a larger scale. The writer admits that paintings would hardly be in place in the railway stations of a large city, where everybody is in a hurry, and where time-tables and advertisements take up too much room; but he thinks they would do much good in smaller places, where they would be sure of appreciation by the rural folk.—*New York Evening Post.*

A RACING-STABLE AS A REFUGE CAMP.—The most unique camp we visited, says a correspondent of the New York *Evening Post*, writing of the condition of things in San Francisco at the end of July last, was that located at the Ingleside Racing Park. Imagine 700 old people, all crippled or in some way helpless, living very comfortably in the stalls of a high-class racing stable. Last October, when the rainy season began, the relief committee found many of these helpless ones living in the parks without shelter. An outcry was at first raised when it was proposed to lodge them in the quarters formerly used for horses. But it has all been done, and well done. The houses are comfortable, sanitary, and spotlessly clean. Each stall has a flooring and its walls are covered with heavy building paper. The tanbark track surrounds the living quarters. Inside, each little stall is made into a cozy room, decorated and furnished. Bathrooms with bathtubs saved from the magnificent Palace Hotel after the fire, stoves for hot water, etc., are arranged. One long stable has been made over into a Social Hall, and very attractive it is now. The largest stable is a dining-room and kitchen, where the 700 old men and women receive excellent meals. There is a dispensary and hospital, with trained nurses. There I found fourteen patients, a small percentage of the 700 inmates. The jockeys' mess-room has been turned into a sewing-room, with twenty-five sewing-machines. Each woman inmate has received two entire suits, and those that can sew are paid for their labor, while the men that can work are employed in the kitchen or in the garden. Many of these people have never been so well housed and so well cared for and fed in their lives. After August, the relief committee will be obliged to give up, and all those that have no relatives to care for them will be transferred to the almshouse.

THE BIXBY-HOTEL VERDICT.—The recent verdict of a jury in Judge Conrey's court, Los Angeles, in a suit of Mrs. Phillips against the Bixby Hotel Company of Long Beach, was against that company alone and not against the architects. The court had early in the hearing rendered judgment for the architects, John C. Austin and Frederick G. Brown, the lengthy examination following pertained solely to the hotel company. The court The jury awarded Mrs. Phillips the sum of $10,000. The case will be appealed. The verdict also excluded the contractor, F. L. Spaulding.—*Architect and Engineer of California.*

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IT was in the nature of things that the brunt of the work of erecting, if not the major share of the credit of designing, the proposed Cathedral of SS. Peter and Paul, at Washington, D. C., should fall to the share of Mr. Henry Vaughan, the resident member of the temporary alliance constituted for the execution of the enterprise, and this likelihood has been made a certainty by the death of George Frederick Bodley, R.A., whose name must always, perhaps a little unfairly as fate has determined, be accorded the place of honor when the building is mentioned. The design that was prepared with such expedition last spring, and accepted on presentation, it seems to us can be hardly considered as much more than a preliminary study that must be more or less seriously modified as the financial difficulties that confront the authorities declare themselves, and these modifications and the natural development of the original design must now be worked out by Mr. Vaughan, unaided by the skill and judgment of his older associate. Fortunately Mr. Vaughan is anything but a tyro in ecclesiastical work, and the fate of the Cathedral of SS. Peter and Paul still rests in competent hands.

AS was natural in the case of one brought up as an articled pupil in the office of Sir George Gilbert Scott, Mr. Bodley's practice lay almost exclusively in the field of ecclesiastical art, and during an active practice of more than thirty years he designed and built a large number of churches of varying size and cost, the series culminating in two cathedrals—a most unusual incident in any architect's career—though in each case there was associated with him a younger architect. In the case of the Liverpool Cathedral, now well on its way to completion, he had as an associate Mr. Gilbert Scott, grandson of his own godfather in the art, while at Washington he had the aid of another Englishman, Mr. Henry Vaughan. If not himself a pre-Raphaelite, Mr. Bodley was at least in touch and sympathy with the movement and a close friend of Dante Gabriel Rossetti, Ford Maddox Brown, Burne-Jones and William Morris, and, like most of the group, practised more than one art; he was not only a musician of ability, but a versifier also, some of his verses having been collected and published.

IT is curious how little concerning the expedition of modern methods of construction and the elastic possibilities of financing almost any undertaking is known by those Protestant ecclesiastics who are undertaking to turn the present day into a great cathedral-building epoch in this country. No sooner is it assured that the Cathedral of SS. Peter and Paul, at Washington, is to have at least a beginning—in emulation of other beginnings at Albany, New York, Denver and elsewhere—than Bishop Paret announces that the building of a Protestant Episcopal Cathedral for the Diocese of Maryland, in Baltimore, is an assured fact. But the good Bishop does what he can to abate impatient expectancy by declaring that "it will take probably from one hundred to two hundred years to build our Cathedral," and this in face of the fact that in the space of three or four years a cathedral for the Roman Catholics has been built and consecrated at Richmond, Va.! If Bishop Paret's leisurely method is to be adopted, there should be no lack of cathedral undertakings, now that the fashion has been set. All necessary is a site, a design and a corner-stone; with these the date of founding innumerable cathedrals can easily be fixed in the early part of the twentieth century, while someone else can be counted on to finish the job during the next one or two centuries, in the good old way.

EVERY architect who possesses a working-library of even modest size has been brought to his wit's end in the attempt to devise some method by which its contents might be most conveniently and expeditiously accessible. Whatever might be the physical characteristics of the method adopted—portfolios, shelves, boxes or drawers, one or the other of which was sure to be adopted—the scientific arrangement was likely to vary with each collection. In the endeavor to discover a scientific method of arrangement that could be adopted with advantage by everyone, Professor Ricker, of the University of Illinois, has developed and extended to architec-

tural books and illustrations the Dewey Decimal System of classification, and those who are interested in the subject will do well to apply to him for a copy of "*Bulletin* No. 13" of the University of Illinois Engineering Experiment Station. While the method and its advantages are quite easy to understand when one has a hundred-page pamphlet to study, it would be difficult in a short space to make anyone comprehend the method. It is enough to say that architecture and construction have been classed, divided and subdivided as to their literature, into groups of ten places, the relation between the subdivision, division and class being indicated by the numerical sequence of the decimal figures with which the illustration, for instance, is marked. The division and subdivision proceed logically, so that the seeker, after brief familiarity with a given collection, cannot have much hesitation in turning with approximate accuracy, and without consulting an index, to the shelf or case where the desired illustration is to be found.

THE system is ingenious, logical and useful, but as its usefulness depends on the collection always being in order and kept up to date, it is suited to an institutional rather than a private library. It can be used with or without an index, but if used without one there is no means of knowing whether the collection contains a given subject, except by running through the matter naturally included in the same group. This has obvious disadvantages, but some real, though less obvious advantages to balance. Granting to the Dewey Decimal System all the good qualities that belong to it, it nevertheless depends, as all other systems depend, on the personal equation, the judgment and knowledge of the librarian, who decides where a given photograph shall be placed, for of course it can have but one actual *locum standi*, though by a properly cross-indexed card-catalogue it may be made accessible in many ways. The photograph that might be used to illustrate a variety of themes yet may be actually quite unused because the librarian has given it a decimal number that brings it into quite another category than would be anticipated.

DURING August of next year the Third Congress of the International Federation for the Development of the Teaching of Drawing, undismayed by its own sonorous title, is to be held in London during the currency of the Anglo-French Exhibition at Earl's Court, which is counted on to add a certain éclat to the occasion, as the display of the French art and technical schools is expected to be both elaborate and interesting; besides this the annual exhibition of the British art schools takes place regularly at this date. Among the nine subjects set down in the programme for discussion, the most interesting seems to us to be "No. 2: Teaching of Drawing in the Professions—Its Definite Inclusion in the University Curriculum." To the majority of university men, to the elders among them at least, we feel that the suggestion will prove repulsive rather than attractive, a distinct closing of the gap that separates the university from the technical school, and yet, when the bases of liberal education are widening in so many directions, and since drawing is essentially a universal language, there are very sound reasons why the teaching of drawing with considerable thoroughness should be included in the curriculum, not only as a permitted but as a required study. At all events there is no question but that those university graduates who take up architecture or art as a post-graduate course in a technical school are needlessly handicapped, as against their younger associates there, through having to attempt the mastery of drawing after their fingers have become somewhat stiffened and, perhaps, battered out of shape through devotion to "athletics."

IT is rather agreeable news that suit has been entered in the Circuit Court of Franklin County, O., against the so-called "plumbing trust," which for years has controlled the prices and discounts on plumbing supplies in the Middle West and South. The fact that about a year ago the Dominion Government was able to bring to terms a similar organization operating "over the line," shows that it is easy to check, if not wholly obliterate, conspiracies of this kind, and the private individual who has had to suffer because of the needless exactions of unwise plumbing laws, and the equally pernicious extortions of the organized plumbing-supply houses, may now take heart and hope to be able to provide his house with something more than a bare minimum of sanitary devices. The new suit is to be considered, too, as in some sort a harbinger of the "open shop," for the law is logical when you know how to arrange your premises, and if conspiracy in restraint of trade is illegal, then, without any chance for questioning, suits should be laid against most of the trade unions now in operation. But, and it shames us to write it, when the Law comes face to face with the organized voter, the Law hesitates.

AS there is a class of architects somewhat given to promoting the erection of large office-buildings or hotels where considerable capital is involved, and who themselves become subscribers to the stock for the sake both of securing the job and promoting the undertaking, it may be worth while to call attention to a suit that has just been brought against some of the subscribers to such an enterprise. Some years ago subscriptions were secured for building a hotel on the old Brunswick Hotel site on Madison Square, New York, but for one reason or another the hotel never was erected, though in its place there was built a large office-building which has all the air of a good income-returning property. The managers of the syndicate seem to have believed they could use at their discretion the money entrusted to them by their fellow subscribers; but this point of view was not shared by some of the men who had pledged themselves to provide a portion of the funds. These men declared that they were interested only in the hotel scheme, and, having no desire to share in the ownership of an office-building, have refused to pay in their subscriptions when called on to do so by the managers, and now must defend the suit brought against them by the Knickerbocker Trust Co.

Tall Buildings the Safest

MUCH of the blame for the San Francisco fire may with justice be attached to the insurance companies that virtually aided and abetted the inferior construction of that city. They made a particularly low rate on poor buildings because of the excellence of the Fire Department, forgetting to count upon the possibility that did happen and that rendered that department absolutely powerless and useless. To a degree the insurance companies are blameable, for the same reasons, for the very inflammable conditions in most of our other cities. They have given some balm to individual sufferers, but on the whole, considered from an ethical point of view, they have not been a godsend to our communities. Their latest move, however, has, quite unconsciously to them, been productive of incalculable good.

Mr. George W. Babb, the President of the New York Board of Fire Underwriters, happened to state at a municipal meeting some time ago that the Board feared and expected that a great conflagration would occur in the skyscraper district of New York. He felt sure that it was only a question of time when at least the upper stories of the tall buildings in the congested district of New York would be destroyed by fire, and prophesied a billion-dollar conflagration, remarking incidentally that the insurance companies could not possibly pay more than 20 per cent. or 30 per cent. of that loss!

His remarks have been widely quoted by the daily press throughout the country and have aroused a vast amount of public interest. People have generally been very apathetic on the question of fire. It constitutes one of the most unbearable taxes to which we are subjected, an utterly useless drain, yet the average man pays scant attention even to the first principles of fire-prevention and when deciding upon building, seems, by a peculiar perversion of intelligence, actually to endeavor to make his structure as combustible as possible. To-day architects and builders, and even the laymen, look askance at our tall buildings, wag their heads when they pass the Singer Tower and show every indication of keenest distrust of the fire-resisting qualities of our skyscrapers.

And all because Mr. Babb has raised a more or less interested cry of alarm!

Bravo for Mr. Babb! Bravo for anything that will make people stop and think for a minute!

Most of our skyscrapers are moderately well built. As a matter of fact the grave danger apprehended by Mr. Babb is only most remotely possible. And if the owners of the existing tall buildings would but add a few protective devices, costing but little additional expenditure, they can make it absolutely and utterly impossible for their buildings or any great proportion of their contents to be destroyed or even materially damaged.

Further, I will venture the assertion that, even with the buildings as they are, the skyscraper districts of New York, Chicago, Boston and Philadelphia are the safest places in those cities in case of fire. In the San Francisco conflagration the ordinary buildings were wiped out of existence, and the tall ones were damaged from 10 per cent. to 80 per cent. of their cost, but those skyscrapers were very much inferior in construction to those of New York or Chicago; some of the principal elements of real fire-protection were absolutely lacking; in many cases only the structural parts, the mere skeleton of the building, was fireproof. Everything else was highly combustible. They "saved" on their window protection, for instance. Had they expended perhaps $60,000 in wire-glass protection at the openings there would have been at least $10,000,000 of property left unburned that was destroyed. All things considered, those few buildings did remarkably well. In Baltimore they not only did well, but they acted as a bulwark, protecting the city against the farther advances of the flames and actually saved the upper part of the city.

The big buildings of the larger cities are being better built every day as architects and builders know more about fireproof construction than they did. But with those tall buildings massed as they are in congested districts and with the spread of internal fire minimized as it is by their very construction, they really constitute the safest districts of generally rather combustible cities. Indeed, paradoxical as it may seem, if all the buildings of a city were only moderately incombustible, say as incombustible as are some of our old-time skyscrapers, there would be little necessity of making any one of them absolutely fireproof, and the more incombustible buildings you can group together the more are you lessening the danger of fire within them and making a barrier of them against the progress of other fires.

Cities have long been urged to take the proper steps toward making the old skyscrapers even immune to fire, but the public has been slow to see that necessity and Mr. Babb's alarmist remarks, though rather much on the "wolf, wolf" order, can be turned to splendid advantage in stirring municipalities and people up to the point where the building laws will be made a good deal more severe than they are now, and in fact exact a better class of construction in skyscrapers as well as in every other kind of building.

No time should be lost in compelling the owners of tall buildings to do certain things, if they have not already done them, that should always be done in the actual process of construction; if stairways and elevator shafts are open, then enclose them in fireproof partitions, so that there are no vertical openings between stories. You then virtually have as many separate buildings as there are stories, and the isolation of parts is the first essential of protection. Then guard your building against external attack by fires in adjacent and inferior buildings across narrow streets and alleyways. Make the openings into your buildings as invulnerable as are the brick walls between the windows. Put in wire-glass and metal sashes, automatically-closing sash, preferably, and you have cut off 75 per cent. of your chances of fire. Install your own water-supply and drill your building employés in handling hose and fire-fighting appliances. This protection may not only save you thousands of dollars, but can be turned to good advantage in a neighborly way.

In building new structures nothing much more than what has already been done has to be resorted to, so far as the structure is concerned. The staunch steel frame, covered in all its parts with brick or porous fireproof tile, cannot be improved upon nor can the brick or fireproof tile partitions and floors. But the exterior shell of the building should far better be of brick and terra-cotta than of stone, granite or marble. These latter materials can be much damaged by any external fire. Then the interior trimmings should be of metal, the floors of marble or other incombustible materials, and wood avoided in every possible place. Cut off the stories so that they are absolutely separate, and even horizontally have as many fire-divisions as you possibly can. The smaller you can get each unit of space the more you are minimizing the danger of fire in any one of those units and making it more impossible for fire to spread from one to the other and the more are you cutting down the necessity of carrying insurance, besides affording the maximum of protection to each tenant (a class whose interests have heretofore been rather ignored). Have all your windows of wire-glass in metal sashes, install fire-apparatus and ample water-supply and keep your building employés well drilled in handling fire and you have made Mr. Babb's prophecy absolutely impossible of fulfillment and conflagrations of $100,000,000 or more merely incidents of past history.

A point closely akin to the fire question and influencing it to a great extent is the regulation of the height of buildings. I firmly believe that lawfully a man can go as high into the air and as low into the ground as he wishes. So far as safety is concerned constructions such as the Singer Tower and vastly higher are not only safe, commercially profitable, legally correct, but eminently desirable in our cities. The one point to be considered is that the individual must not tamper with his neighbors' rights or those of the community. To make a chasm of our streets is an imposition and should not be tolerated. The one sane thing to do is to regulate those heights according to the width of the street. On certain streets you should be allowed to build up five or six stories on the street line, then recede so many feet and go up another five or six stories, recede again and so on up, thus assuring the maximum of light and air to everyone. There should also be regulations compelling the leaving of a certain amount of light-space at the rear of the lot and then light-spaces at the side are matters of comity between owners.

The trouble is that any such present regulation would work

an injustice to the new builders because the old structures have been permitted to go up all their height on the building line. Howbeit, that is a matter for lawyers to adjust. A learned New York professor has resuggested the old idea of the pyramidal construction of each block. Such a thing is possible but highly improbable. It is but a form of this step-back construction that we have long advocated, but could only be done where one owner controls an entire block and it would further absolutely waste and darken a vast amount of usually available space. The thing is a pretty dream, but is impracticable, a commercial impossibility. For the tall buildings to be "stepped-back" would assure not only well-lighted streets, but the greatest safety against communication of fire from building to building and would also add to the artistic appearance of a city, for then there would be certain continuous "skylines" at the various story heights of the steps. For instance, even though one building were twenty stories high and the next one but ten, the fifth or sixth story of each would form a continuous ledge and make that the height of one level clear through the street.

To attempt to discredit the skyscrapers as dangerous constructions shows a lack of good judgment; to try and prevent their construction is utter folly, but to insist upon their being better built than they are is not only most wise, but imperatively necessary.

F. W. FITZPATRICK.

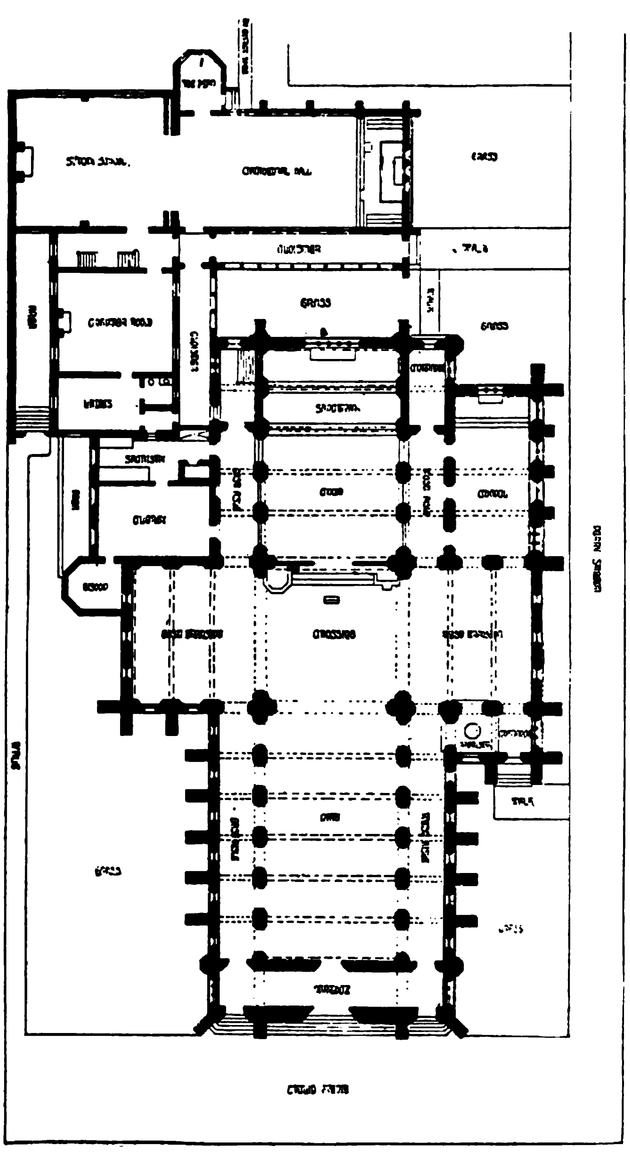
Trinity Cathedral, Cleveland, O.

TRINITY CHURCH, the new cathedral church of the diocese of Ohio, has been completed from the designs of Mr. Charles F. Schweinfurth, and was consecrated on September 24, last. We are indebted to the *Churchman* for the description.

The plan is cruciform, the length of the cross being 175 feet and the width across the arms 112 feet. The cathedral is connected in the southeast angle with the parish buildings, communicating with the same through the dean's study, the chapter room, and the cloister, and thence with the choristers' hall, cathedral hall, and the Church Home.

The main entrance to the cathedral is from Euclid Avenue by three deeply-recessed and molded portals, which later may be carved also. The narthex is 10 feet wide and 60 feet long. There is also a west, or baptistry, entrance, an east entrance, a south entrance, and a southeast entrance from the cloister of the parish buildings. The exterior is of buff Indiana limestone, all smooth-cut and molded, and carved in detail. The interior is of limestone detail in nave and transepts, with russet-colored brick wall spaces; in the tower, the choir and sanctuary all is stone, with increasingly-elaborate panelled tracery, panels, moldings, and carvings. The four main gables have large mullioned and traceried windows, that in the chancel being already filled with English-made glass, in harmony with the adjoining work. It is known as "the Te Deum window," and is a memorial. The other gable windows will, eventually, be filled with similar memorials, as will all the other window openings, which are now glazed temporarily with amber cathedral glass in heavy leads.

The heights of exterior are, from grade to coping of side-walls, 29 feet; to coping of clerestory walls, 52 feet; to apex of gables, 76 feet; to top of tower, 137 feet. The tower, 40 feet square over crossing, has octagonal corner pinnacles, with lesser wall-angle pinnacles dividing each side of the tower in three bays in width, and two stages in height, a clerestory with openings into crossing, and a bell deck above. The openings in the clerestory have stone tracery, and the bell story has stone tracery and louvres; in this upper stage the chime of bells is to be placed. This tower is a memorial, as is indicated by a bronze tablet in the floor of the cathedral at the centre of the crossing. As the tower rises over the copings at the intersection of walls, wide-spreading angle-buttresses support the corner pinnacles.



GROUND PLAN OF TRINITY CATHEDRAL, CLEVELAND, O.

The height of the interior side aisles is 21 feet; of the aisle arches, from floor to apex, 19 feet; from the floor to the root cornice, 41 feet; from the floor to the apex of arches at the crossing, 54 feet; from the floor to the molded ridge-beam, 67 feet, and from the floor to the soffit of bell deck, 77 feet. The molded cornice extending all around the interior is filled in the cove with representations of singing heads with wings, cut in the stone. The four main pillars supporting the tower are memorials, as are also the columns in the nave and in the transepts. Each is designated by an appropriate inscription, and each has a capital of different design and significance.

The baptistry at the west entrance is formed by arches of the transept aisle, and here is located the trinity column, triple in plan, from which three arches spring, with a carved capital illustrating the seventh chapter of Ephesians, with emblems and symbols of Holy Baptism and of Christian warfare. On the trinity column is a representation of an angel cut in the solid stone in full relief, in an attitude of entreaty or invitation. The font of white marble is a memorial taken from "Old Trinity," with new carvings, octagonal platform, and an elaborate oak canopy. The canopy is suspended from the ceiling with a bronze counterpoise weight. The upper stage of the canopy is a miniature of Trinity tower. The interior of the basin, or laver, of the font has been inlaid with ten large pebbles taken from the reputed place of our Lord's baptism in the River Jordan. Seven of these stand for the sevenfold gifts of the Spirit, and the remaining three typify the sacred Trinity. They were presented to the Bishop of Ohio by the Bishop of Washington. The baptistry is emphasized on the exterior of the building by a larger window than those adjoining, filled with tracery. A stone tablet under this window reads: "The Cathedral League, a band of one hundred Christian women, have, by their gifts, erected this baptistry. In the Name of the Father, and of the Son, and of the Holy Ghost."

The pulpit, at the southwest pillar, and the rood screen base are of Pavonozza marble, from Pietrasanta, Italy, and together form a memorial. The pulpit is octagonal, pierced with open tracery and moldings, decorated with symbolic carvings. The lectern, at the southeast pillar, is of bronze. The litany desk is of English oak, and is supported by two angels, representing "Supplication" and "Intercession." The seats are of English oak, with perpendicular panelled ends, with oak floors, while the floors of all aisles and other spaces are of dove-colored marble in two shades, laid in alternate diagonal squares, enclosed in darker-colored marble borders. In the choir are twelve stalls, for the dean, archdeacon, and canon, six on either side, with elaborate canopied hoods with pinnacles; and forty-eight minor clergy stalls, each with carved finial ends, and fifty choir stalls. The clergy stalls and canopies are a memorial. The front of the choir stalls is panelled, and carved with continuous scroll and cherub heads. Over the entrance to the chancel from each side aisle is a representation of an angel choir, with scroll cut in full relief.

The bishop's throne is also of English oak. In it has been incorporated a portion of the original bishop's chair from "Old Trinity." It is elaborately carved with the seal of the diocese, a bishop's mitre, bosses and heads, recumbent lions, and surmounted by a trinity cross with foliated ends. This throne is a memorial. The sanctuary rail, also a memorial, is in bronze, and consists of a series of intertwined and locked quatrefoils with *fleur-de-lis* spandrels enclosed in open pedestals, each holding a cross in the panel, with molded base and rail.

The altar is a single piece of Pavonozza marble, 11½ feet long, 2½ feet wide, and 3¼ feet high, with three molded panels, symbols of the Trinity, on each side. On one end is the memorial inscription. The faces of the mensa are carved in relief, with grapevine leaves and fruit intertwined, and heads of wheat, divided with panels enclosing the words "Sanctus," "Sanctus," "Sanctus." The mensa is one piece of Sienna marble, 12 feet long, 3 feet wide, and 4½ inches thick. The reredos is to consist between the concrete and the steel favors action of this kind. panel enclosing a cross, with Christ triumphant. The credence at the right of the altar is cut in the solid stone, and the tracery in relief above it is supported by an angel with clasped hands.

The floors of choir, chancel, and sanctuary are in two shades of dove-colored marbles, with symbols intertwined in Numidian and Verde Antique. The four series of steps leading from the floor of the nave to the altar are of statuary marble. The ceilings of nave, transepts, choir, and sanctuary are of English oak, in Gothic barrel-vaulted forms, with molded ribs, ridge and purlins forming panels with octagon pendants at each intersection with the ridge. The ceilings of choir and sanctuary are more elaborate, having heavily-carved bosses at the intersection of ribs and beams. The ceilings of the aisles are divided by stone arches into bays, forming panels, which are filled with molded oak beams.

The main organ is placed at the southeast corner, over the clergy and sacristy rooms and the aisle, also over the southwest aisle. The nave organ is located in the crypt to the right of the main entrance to the cathedral. No organ pipes are visible, the openings to the organ chamber being filled with strone tracery in the transepts and oak tracery openings into the choir. The organ has two consoles, one in the choir and the other in the chapel, which has in general the same detail as the cathedral. The cross-beam over the chancel-rail has a carved oak boss from the cathedral at Southwark, England, which was carved 457 years ago, and was sent by the Lord Bishop of Southwark to the Bishop of Ohio, to be incorporated into Trinity Cathedral. In the chapel are memorial windows of stained glass, and on the walls bronze memorial tablets, all taken from "Old Trinity" and affectionately placed here, as were also the marble altar and the sanctuary rail.

Five years have been consumed in the structural work, and the total cost has been approximately $650,000. Memorial furnishings to the value of about $100,000 have already been contributed for the cathedral.

Notes on Some Additional Tests of Concrete Columns[1]

In continuing the tests of concrete columns at the Watertown Arsenal Testing Laboratory, reinforcing material has been arranged to adequately illustrate the more prominent features pertaining to concrete strengthened by means of external lateral support. Helixes of different sized wires and pitches of coils will be used to reinforce different concrete mixtures.

The two principal questions which present themselves for consideration in the employment of concrete, plain or reinforced, are strength and rigidity.

Referring first to reinforcement by means of longitudinal bars imbedded in the concrete, it is evident that ultimate strength may be progressively raised by successive increase of the proportion of steel until finally an all-steel column results, and there can be no doubt that a column composed chiefly of steel will be more rigid than one composed chiefly of concrete, whatever the mixture of the latter may be, although experiments have shown that a small percentage of steel does not promote rigidity—at least not always.

As to the intensity of the compressive stresses in the steel, they become greater over observed parts of the tests as the concrete mixtures are made leaner, a given percentage of steel being present, while the total load carried by the steel will increase in a given concrete mixture as the percentage of metal increases.

This states the general behavior of concrete reinforced with longitudinal bars, modifications being introduced affecting the relative loads on the steel and the concrete according to the method of applying the stresses. An inspection of the measured compression deformations given in the details of the arsenal tests will show the range of stresses taken by the longitudinal bars at different stages of loading.

It will be understood that the resistance of the concrete is not increased by the presence of the longitudinal bars, the latter merely relieving the concrete of a portion of the total load placed on the column. The strength of the concrete may, however, seemingly be increased by reason of variations in the intensity of the stresses on the bars giving extra support here and there to zones of local weakness. The adhesive resistance between the concrete and the steel favors action of this kind.

Now, passing to the method of reinforcement by means of external lateral support, here a true increase in the resistance of the concrete may occur, and higher loads be attained without impairment of the integrity of its structural state.

The physical properties of dense materials, so far as known, are not affected by loads of cubic compression, and an efficient system of lateral support introduces conditions approaching those present in cases of cubic compression. If such an end were fully attained in a reinforced column, apparently there would be no practical limit to the strength of the concrete. Of course it is not feasible to provide adequate external support to meet this ultimate possibility, but whatever is accomplished in the direction of the diminished development of strains tends toward increased strength of the material.

It is a practical question to judge how far it is expedient to provide reinforcing material, and a problem to experimentally determine in what degree direct compressibility is modified or lateral expansion of the concrete restricted thereby.

If it were possible to wrap a finished column with a steel wire helix, putting the concrete under initial strains before loading, maximum strength would be expected. In practice possibly the external reinforcement may not initially be in close contact with the concrete, or it may even be loose in places, and fail to give support during the early stages of loading.

The arsenal tests in progress are expected to show the degree in which the rigidity of the concrete is influenced by the use of wire helixes, covering the range of material used in current engineering practice.

The conditions existing in columns of earlier tests were such that probably no material gain in rigidity was realized from the presence of the exterior reinforcement. The wide range of material to be uesd in the coming tests should afford information along this line of inquiry.

Ultimate strength will be substantially raised, probably, even though the structural integrity of the concrete is not maintained until the maximum load is reached. Loose material within a suitable envelope should necessarily sustain high stresses and transmit loads to parts beyond.

[1]Read at the Atlantic City meeting of the American Society for Testing Materials, June 20-22, 1907.

Economic as well as engineering questions seem involved in the design and use of reinforced concrete.

Referring now to some columns comprised in the exhibit of the Watertown Arsenal Testing Laboratory at the Jamestown Exposition, two are there exhibited of considerable strength. One is a neat-cement column, the other a reinforced concrete of 1 : 2 : 2 mixture, with a steel-wire helix as the principal reinforcement.

The neat-cement column was loaded with 7,000 pounds per square inch and the test then discontinued. No apparent injury resulted from the application of this load. It is well to bear in mind the load successfuly sustained by this neat-cement column, when considering the strength of ordinary concrete mixtures.

The reinforced column reached a maximum stress of 7,726 pounds per square inch, referred to the sectional area within the steel-wire helix. The column had an exterior shell which flaked off before attaining the maximum load, leaving the full stress to be sustained by the concrete enclosed by the helix. Notwithstanding the high resistance displayed by this column, it would probably have reached a still higher limit had not local failure occurred at the upper end where there was about an inch of unsupported concrete above the helix. At the lower end the last coil of the helix came to a bearing against the platform of the testing-machine.

The reinforcing metal of this column was furnished by Mr. R. Baffrey, President of the Hennebique Construction Company, New York.

Accompanying these columns was a third one, now sustaining a stress of 1,000 pounds per square inch, the load being maintained by means of steel side rods. This column belongs to a series on the endurance of concrete under long-continued loads, the composition of the column being 1 : 1 : 2.

Recognizing the interest which attaches to material in the condition actually used in constructive work, invitations have been extended to constructing engineers and others in several cities, requesting them to send to Watertown for test purposes columns made under their direction, representing current work, to be taken directly from work in process of execution. Favorable responses have been received and columns are now in transit to the arsenal, while others are being made in accordance with this invitation, cooperating with the Arsenal and giving wider scope to the present series of tests by furnishing practical examples of work, supplementary to the laboratory-made columns.

James E. Howard.

Wood Utilization in the United States[1]

Pending the creation of a new wood supply by forest management and planting, we must solve the following problems in order to make our present supply go as far as possible.

Reduction of Waste in Manufacture. According to present practice but little more than 25 per cent. of the cubic contents of a tree reaches the consumer in the form of lumber. This would not be important were the other 75 per cent. made to serve some useful purpose, but so far this has not been the case. The guiding principle for the future must be that every part of a tree is intrinsically capable of utilization, and that in consequence—

Logging will be done more carefully, stumps will be cut lower, and tops higher. There will be greater care in cutting the tree up, and log lengths will be adapted to the peculiarities of the tree, rather than being arbitrarily fixed. Lops, tops, and stumps will all be used eventually; probably for fuel, excelsior, distillation, or pulp, depending upon the locality and species. Needless to say, thousands of feet of logs will not be used for temporary roads, slides, and skidways, and then left to rot in the woods. Neither will any tree be left to decay simply because it is crooked or of an inferior species. Everything in the forest will be used.

Manufacturing will be more economical. The band-saw has now largely replaced the circular-saw, and it will do so more in the future. This alone means a great saving in saw-kerf. Logs will be slabbed more carefully. There is a saving in slabbing a log on four sides instead of on only two sides before cutting it up, but this is not always done. Slabs will be more closely utilized, and even now the best-managed northern mills find it profitable to run their white pine and hemlock slabs through a horizontal band re-saw, and so obtain one or two additional narrow boards. There will be less waste at the edger and trimmer. There is little reason for making only even lengths and widths in the stock grades of lumber, aside from large dimension stuff, and it is pure nonsense to cut two feet off from a board because a knot is within six inches of the end. The movement in favor of odd widths and lengths has made notable progress among lumber manufacturers in the last year. We may expect that slabs, edgings, and trimmings will cease going into the burner, and instead be devoted to some useful and profitable purpose. Aside from the usual output of lath and shingles as by-products of lumber manufacture with certain species, we may expect to see some of the present waste converted into small-dimension stuff, box-boards, crate-sticks, and other articles, with always a possibility of conversion into pulp or wood-distillation products. So long as the sawdust feeds the mill furnaces, it may be considered satisfactorily utilized. A comparatively recent departure in lumber manufacture that is rapidly gaining ground is the production of veneer stock. This is a most economical method of cutting up a log, particularly if done by the rotary process, since there is no loss whatever in sawdust, and the cores can be used for crate-sticks, box-boards, pulp, fuel, or other purposes. Veneering makes the same quantity of material go much farther than it would if sawed in the ordinary manner, and the weakening of the demand for quarter-sawed oak lumber is directly chargeable to the increased use of veneer stock. An association has recently been organized and standard grades for veneer stock adopted.

Lumber will be handled more carefully in the yard, and less exposed to injury by the elements. Methods of seasoning, both in the air and in the kiln, will be improved, and loss through warping and checking will be reduced.

Economies in the Use of Wood. We are using annually over 400 feet board measure of lumber per capita, while Europe averages but 60. We can and must learn to use less and use it more judiciously. A great gain is now going on in the use of steel, cement, and concrete. A cement-block house now costs but little more than a wooden one, and in a few years it will be cheaper. Reinforced-concrete is used for piles, bridges, warehouses, etc. The highest type of modern office-buildings are constructed almost entirely of steel, brick, and other artificial material. Cement walks in towns are replacing wooden ones, with decided gain in utility. The production of Portland cement in the United States has increased 400 per cent. in the last six years.

We can learn to use one fence-post, one cross-tie, one mine-timber, and one telephone-pole where we now use two, and still have the same or a greater amount of service. This is possible through the prolonged life obtained by preservative treatment. The saving in timber along this line will reach into millions yearly.

It is estimated that nearly 10 per cent. of the annual lumber cut of the United States goes into packing-boxes, and in fact 80 per cent. of the white pine cut in New England is so used. Yet the life of a packing-box is remarkably short, and after serving its initial purpose it is cast into the rubbish-heap. Much can be saved along this line.

Mechanical tests upon all the principal woods, to determine their strength, stiffness, and other physical properties, and the effect of knots, checks, and other defects upon commercial sizes, will give the proper basis for grading rules and indicate clearly the kind and quantity of material needed for a given use.

Substitution of Other Woods. Woods which have long been considered inferior or useless will be utilized and in many cases substituted for ones which are getting scarce. The evolution of the wagon-box is an excellent example. Once, the standard box-board was white pine, then came yellow poplar, then cottonwood, more recently red gum, and to-day the formerly despised tupelo is going into wagon-boxes, though surreptitiously,—to-morrow it will hold an honored place. Each of these changes has come about as a result of the decreasing supply and increasing price of the wood formerly used.

Similarly, axles are being made of maple instead of hickory, and implement poles of long-leaf pine instead of oak.

Though it does not seem at present possible to get something else equally as satisfactory as hickory for buggy parts, elm for

[1]Extract from a paper by Mr. R. S. Kellogg, Forest Inspector, U. S. Forest Service, read before the Western Society of Engineers.

slack-barrel staves and hoops, and white oak for tight cooperage, there is a great field of possible substitution, since so little is really known of the essential properties of most American woods.

These remarks simply indicate a few of the big problems which are waiting to be solved. It is a time of rapid changes and readjustments to new economic conditions, and the users of the forests must be prepared to face them. Happily, there is every indication that eventually these conditions will be successfully met. The potential forest area of the United States is sufficient, if rightly managed, to produce all the wood we really need. The lumberman, if not just now, can soon afford to handle his lands according to forestry principles, and the national forests, while at present a relatively small factor in the annual output, will rapidly increase in importance.

It is the duty and privilege of the forester on the one hand to demonstrate how these products may be made as abundant and of as high a grade as possible, and on the other hand to indicate how they may be utilized most economically and advantageously. Surely, this is an object worth striving for.

Saving St. Mark's

I HAVE had the advantage of going over St. Mark's with the engineer in charge of the repairs, and it may, therefore, be of interest to describe exactly what is being done to the famous basilica.

There are two different parts of St. Mark's on which the workmen are at present engaged. The first and most important restoration is that of the so-called "Angolo di Sant' Alipio," which projects from the left corner of the atrium opposite the entrance of the Merceria. The perilous condition of the "Angolo di Sant' Alipio" is due to its history and the mode of its construction. It was built on to the rest of the basilica about the middle of the thirteenth century, when the republic had been enriched by the spoils of Constantinople, and the technical blunder was then committed of uniting this new edifice to the masonry of the already existing church, already some two centuries old. When one climbs up the scaffolding inside the "Angolo" one can distinctly see the marble cornice which formed the outside of the original building. At this point there are huge fissures, large enough to insert one's hand, where the masonry of the thirteenth century has separated from that of the eleventh, which is far stronger and much superior to it. But this is not the only sign of collapse. The foundations of the "Angolo di Sant' Alipio" were laid in an old cemetery, and the edifice, therefore, reposed upon decaying matter, which had to support a weight of 36,000 kilogrammes. As long ago as 1765 the displacement of this corner of St. Mark's was noticed, and the architects of that period accordingly fastened the columns of the "Angolo" to the main building by means of an iron bar. This bar is now the sole support of the upper part; it is already a few degrees out of its original position, and if it cracked, as the engineer remarked while we stood beneath it, then down would come the "Angolo."

Nor is this all. The iron clamps inside the columns, owing to oxidization, have gradually split the marble, and it is necessary to remove the oxidized metal and replace it with bronze—a difficult and slow process. Owing to a curious accident it is possible to calculate with mathematical accuracy the exact displacement of the "Angolo" since 1800. In that year the authorities erected a simple iron sundial on one of the columns. An iron rod was inserted in the marble, and a deep furrow was drawn down the pillar, which faces due south. It has been observed that at midday the shadow of the rod no longer falls on this line, but is three and a half centimetres out of the perpendicular; it therefore follows that the "Angolo di Sant' Alipio" has been displaced as much as twelve centimetres in 107 years. Last May a plan for its complete repair was examined by the committee of management; this plan has just been approved, and the work of saving this lefthand corner of the atrium is now being actively prosecuted. The men employed on St. Mark's, who have their workshop in the desecrated Church of S. Basso, hard by, do eight and a half hours a day, exclusive of their meals and their siesta, and every quarter of an hour's delay costs them a quarter of their daily wages. Inside the basilica itself the so-called "Arcone dell Albero genealogico della Vergine"—a name derived from the great genealogical tree of the Virgin, which is depicted on the mosaics of the north transept—is now in the hands of the workmen. A large wooden platform has been erected, supported on cross beams, and the men have now practically finished their task here. The mosaic had fallen away from the wall, the bricks had begun to drop on to the floor, and huge cracks had appeared in the masonry, of which photographs were shown me. This part of the arch has now been entirely replaced by new materials, and soon the scaffolding can be taken down.

There are two other parts of the basilica which have been taken in hand, but upon which work has been temporarily suspended. These are the "Tribune of the Patriarch" and the "Arch of the Apocalypse." The importance of the repairs to the former may be judged from the fact that the four "Tribunes" have to sustain the greatest weight of the basilica. One can see, now that all the mosaic has been stripped off this "Tribune," that a portion of the arch, close to the keystone, as well as the cornice, has fallen several centimetres. It was here, behind the mosaic, that a coin of the year 1205, the year after the Latin Conquest of Constantinople, was found last winter. As for the "Arch of the Apocalypse," at the west end of the church, that is still filled up with the massive scaffolding, which seems as if it, too, were intended to last forever. It was judged that the "Angolo di Sant' Alipio" required more urgent attention, so the "Apocalypse" has been left for the present much as it was when I visited it last year. There is still some scaffolding in the atrium of the church, but the work of removing the iron clamps from inside the columns and replacing them with bronze has been successfully accomplished, and no one but an expert would now know that the columns had been raised and replaced.

Besides the great basilica, the administration of St. Mark's is undertaking extensive repairs at three smaller churches—S. Moisè, S. Giuliano, and S. Gallo. Outside its jurisdiction, but also undergoing structural restoration, are the important churches of the Frari, of S. Francesco della Vigna, and SS. Giovanni e Paolo. Thus, it is by no means easy to see the monuments in many of the Venetian churches—that of Benedetto Pesaro, for instance, in the Frari, is covered up with scaffolding, while one of the largest pictures in the Doges' palace has been taken down from the walls. Venice, in short, is given over to architects and engineers, but the work has been undertaken none too soon. It is now believed that all the threatened edifices will be saved.—*London Morning Post.*

The Building for the American School of Correspondence, Chicago, Ill.

The new building for the American School of Correspondence has been erected near Washington Park, in the city of Chicago, Ill., within two blocks of the administration offices of the University of Chicago and facing the university campus. Its location, therefore, suggested an exterior design which would harmonize with these surroundings. Fortunately, the educational function of this institution made it entirely appropriate to give a scholastic character to the exterior of the building and thus prevent conflict with the architectural treatment of neighboring structures. Being essentially an office building as well as a school, the problem was to provide a fitting place for administrative and business offices and for carrying on a peculiarly modern method of education. The architects, Messrs. Pond & Pond, have produced a building which, with its quiet and substantial exterior and distinctly modern interior decoration, seems to solve the problem very happily.

The building faces south. It contains four stories and basement. The general interior plan is that of the letter E, 130x96 feet, the return of the east and west wings inclosing on two sides an open court, walled in at the rear and entered through an arched driveway.

The materials of the exterior are paving brick of two shades, with Bedford stone for enrichment, and moss-green tile in the roof. The brick used in the basement and projecting courses of the rustications, is of a purplish-red, somewhat darker than that used in the body, its depth of tone being strengthened by being laid with dark joints. The brick in the body of the wall is a medium-warm red, somewhat variegated, and thus having life and pleasing texture, its general contrast to the darker material being emphasized by being laid with white joints and by the white finish of the window-sash and frames.

The note of green struck in the roof tiling is carried throughout the interior wood-finish of the building, which is of quartered oak, the notes of purple and red also reappearing in the wall decorations, and the red in the polished granite of the entrance steps and in the flooring of the vestibule and corridor on the ground floor, which consists of plain red English quarry-tile, laid with broad, dark joints, and relieved by occasional mosaics of glazed and vari-colored tiling. The general interior color scheme is seen

to best advantage in the vestibule. The high oaken wainscoting, the ceiling beams, and the furnishings are tinted a soft green; the walls and ceiling panels a warm buff, relieved with conventional flower designs in red, green, and purple—the whole blending harmoniously and in pleasing contrast with the general darker tinting of the tiled floor.

The offices of administration are on the second floor, and the rest of the building is used for the accommodation of the staff of instructors, editors, and the employés in charge of the various details of the school's work. An interior telephone system permits rapid intercommunication of all departments. For facilitating the work of the business office and mailing-room, several of the latest electrical appliances have been installed, including an adding-machine, a folding-machine, and an envelope-sealer—all operated by electric power. In the basement are the stockroom, the shipping-room, and also the steam-heating plant. The system of heating is known as the "direct-indirect," the larger radiators on the several floors being located in juxtaposition to cold-air ducts leading from the outside through the walls, an abundant supply of fresh air being thus provided at all times. Electricity is used throughout for lighting purposes, all the corridors and larger rooms being equipped with Nernst lamps, the other parts of the building with incandescent lamps. Lavatories with hot and cold water are located on each floor.

In short, the building is admirably adapted in all its interior arrangements and appointments to the use for which it was designed—to carry on the business of imparting technical instruction by correspondence.

ILLUSTRATIONS

BUILDING OF THE AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, ILL. MESSRS. POND & POND, ARCHITECTS.

A description of this building will be found in another column.

HOUSE OF MR. W. K. VANDERBILT, JR. FIFTH AVE., NEW YORK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS.

This house stands next door to the Fifth Avenue residence of Mr. W. K. Vanderbilt, Sr., and its exterior is designed in early French Renaissance style to conform with it. The walls are of Indiana limestone, with carvings by M. C. Henry & Co. from models by Rochette & Parzini. Fire-resisting materials are used throughout and the main staircase is of stone. The kitchen is located in the basement; its floor is of cork and its ceiling and walls of Guastavino tiles. The laundry and servants' quarters are on the top floor. The dining-room walls are divided into panels by pilasters of dark Fleur de Peche marble with bronze bases and capitals; the wall panels are of lighter-colored marble and the ceiling is decorated with painted panels.

TRINITY CATHEDRAL, CLEVELAND, O. MR. CHARLES F. SCHWEINFURTH, ARCHITECT.

A complete description, with a floor plan, will be found elsewhere in this issue.

HOUSE OF H. S. WAITE, ESQ., COLUMBUS, O. MR. FRANK L. PACKARD, ARCHITECT.

NEW SWISS HOME, WEST 67TH STREET, NEW YORK, N. Y. MR. J. E. SCHARSMITH, ARCHITECT.

The old Swiss Home was opened in 1883 at 108 Second Avenue, New York, but the great changes of the next twenty years made its location unsuitable, so the Swiss Benevolent Society, with the co-operation of the Swiss Hall Association, decided to erect a new building. The New Home is a four-story building, with cellar and basement. In the basement are a waiting room, smoking room, dining room for transient occupants, kitchen and laundry, store room, repair shop, fumigator and bath and toilet rooms. On the first floor are the office and meeting room, dining room for inmates, small sitting room, and agent's apartment; on the second floor, sitting room for women inmates, ten bedrooms and bath room; on the third, eleven bedrooms and bath room; on the fourth, eight bedrooms for transient inmates and a cedar closet. The total cost of the building was $69,428, which includes gas fixtures, ranges, etc., complete, but not any architect's commission.

Additional Illustrations in the International Edition.

ENTRANCE DOORWAY: HOUSE OF MR. W. K. VANDERBILT, JR., FIFTH AVENUE, NEW YORK. MESSRS. M'KIM, MEADE & WHITE, ARCHITECTS.

DETAIL OF SOUTHEAST CORNER OF THE SAME.

NOTES AND CLIPPINGS

DISCOVERIES AT ELEPHANTINÉ.—Archæological work is being carried on in the island of the Nile known as Elephintiné under the auspices of the French government and directed by M. Clermont-Ganneau. This island is situated in the middle of the Nile, not far from the first cataract. Owing to the character of the ground, the work of excavation is somewhat difficult; but a number of objects, some of which are of considerable value, have been found. Among these may be mentioned two large steles of diorite, covered with inscriptions of Thotmes III. A curious kind of sanctuary decorated with miniature obelisks and covering a spot which was used for burying the bodies of sacred animals was also found. These animals proved to be rams, carefully mummified and buried in sarcophagi of granite. The wrappings of the mummies are gilded and ornamented with painted scenes of a mythological character and bear inscriptions. The ram was among the sacred animals of Egypt, and seems to have been specially consecrated to the deity Khnoum, one of the principal deities of the island. Among other finds are many fragments of texts inscribed upon pieces of pottery and known as *ostraca*.

The inscriptions are in hieroglyphic, hieratic, demotic, Greek, Arab and Coptic, and there are about a hundred in all. The presence of the Aramean language shows that even as far back as the fifth century B. C. the island was inhabited by the Jews, as also the neighboring locality of Aswan. Papyrus inscriptions had already proved this fact, but now we find just what quarter of the ancient city was inhabited by the colony of Jews; as the *ostraca* are not found anywhere else. According to the records a Jewish temple must have existed in this locality, and the excavators are hopeful of finding it.—*Scientific American.*

AN INEXHAUSTIBLE WATER-STOUP.—Objects which appear strange to modern understanding are described in archæological dictionaries and inventories. But a font or stoup which is always filled with water is a novelty. It was the strangest object seen by the members of the Cambrian Archæological Association this week. On Monday they visited the old church at Llanidan, and, according to custom, the first object investigated was a stoup in the wall at the entrance to the church. This has the peculiarity of being always full of water without overflowing, and several explanations of the phenomenon are adduced. One is that the water trickles from the roof. Another, and the most generally accepted, is that the stoup is porous, and that the water reaches it by suction from a spring below. It has been testified by a servant man engaged for fifty-six years at Llanidan Hall that he only saw the stoup dry once, and that was for three days during a very dry summer. So much attention appears to have been given to the supply there was no question about the withdrawal of the water. Several able archæologists were present, but they could give no explanation of the phenomenon. Apparently it is a miniature water supply prepared by nature, and the wonder is that it was not utilized for other than ecclesiastical purposes.—*The Architect.*

OILED ROADS AND ARCHITECTURE.—An unexpected sequel has occurred in connection with the Chatham Corporation's experiments in tarring the highway in New-road, with a view to minimizing the dust nuisance caused by the passage of motor cars. The tar adhered to the boots of people crossing the road, and the floor of the new Presbyterian Church was soiled, marked and discolored. The authorities of the church have called upon the corporation to bear the cost of scraping and polishing the floor, but the latter body declines to admit responsibility.—*Building News.*

TIMBER CHURCHES IN ENGLAND.—On the occasion of a recent visit of the Lancashire and Cheshire Antiquarian Society to Holford Hall and Nether Peover Old Church, the Hon. Secretary, Mr. George C. Yates, read a paper on timber churches in England. He pointed out that such churches, lineal descendants of the Scandinavian *stave-kirke*, were formerly to be met with in all parts of our woodland counties, but now the total number scarcely exceeded a score. Within easy distance of Manchester, however, there were no fewer than six—five of them in Cheshire. These are the churches of Denton, Chadkirk, Warburton, Marton, Siddington and Nether Peover. The last-named is of great interest. It is believed to have been built about the end of the thirteenth century, and its timbers are still sound.—*Builders' Journal.*

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THE moderately observant urbanite who during the recent glorious autumn weather has had the good fortune to spend some days in the country cannot have failed to remark once more that amongst the natural birthrights of the American is the right to pure air and unveiled sunshine. The right is real and it should be inalienable. It is not mere bombast to say that it should be made a crime to deprive him of it. Yet when the urbanite returns to his clouded skies he realizes that he has been deprived of something of very real value and that the rape has been committed—and for their selfish advantage—by a comparatively small number of his fellow-citizens, a number so small that the law can easily coerce them if the law so chooses. The smoke-nuisance is one of our most "burning questions," for it seems a greater crime to pollute to the point of insanitary discomfort the clear American atmosphere, with its strong and steady air-currents, than to befoul in like way the more languid airs of Europe. It is physically comparatively easy for the cities of our Eastern seaboard to maintain an approximately pure and natural atmosphere, though not so easy for inland cities, which are obliged to use soft coal exclusively as fuel. Yet even there, by persistent endeavor and a real enforcement of the statute-law, a greatly improved condition can be effected.

THAT this is so is evidenced by the report of the New York Anti-Smoke League, just issued—a private organization, of the busybody variety perhaps, which is accomplishing a considerable and quite unexpected amount of good. What its accomplishment means may not be readily granted by one who from the top of a skyscraper sees black smoke lazily belching from many a chimney-top on every side of him, but that it is real and that the League is making headway against the evil is shown by the record of convictions it has secured of violators of the smoke-law in the last five years. These convictions have been: In 1902, 17; 1903, 46; 1904, 0; 1905, 0; 1906, 132. And the care with which their cases are prepared is shown by the fact that in 1906, out of 196 cases tried, 132 convictions were had. Twenty-five suits still await settlement, while only thirty-two were dismissed. Better and more encouraging than this is the statement made as to the present attitude of the great public-service corporations, which, as everyone knows, are the most prolific distributors of smoke and soot. When brought up for violation of the ordinance, the great light-and-power companies actually claimed exemption on the ground that, as they were providing light and power for public consumption, they should be granted the privilege of doing the work in as dirty a way as was convenient to them, even if it did annoy a small fraction of the public they served. But, on pressure and argument before the Board of Health, the New York Edison Company at length agreed that with the aid of its own experts and those of the League and the Board of Health, it would conduct "a series of elaborate experiments in smoke combustion." These experiments have been loyally made and, as the report says, "the officials of the New York Edison Company have in good faith made every effort to reach a successful solution of the problem which confronted them, and they have succeeded far beyond their anticipation."

SMOKE-PREVENTION is a matter of very real concern to architects, for not only does the building of furnaces, fireplaces and chimneys fall within their province, but the output of their talent as creative artists is more affected by it than is the work of any other class of men. Who that rides by Grace Church on Broadway to-day would guess the building to be of marble? It is with difficulty that one can note a shade of difference in color between the new spire added a few years ago and the older parts of the building, and the condition of St. Patrick's Cathedral and the Washington Arch is hardly a whit better, while the new Public Library, "cleaned down" only a year ago, already begins to look disreputable. What marble buildings could and should look like is familiar to those who have traveled in Italy, and there is no tenable reason why marble buildings in this country should not have a similar aspect and confer pleasure on beholders, if only the authorities can be forced to give them the protection which the law confers.

ONE of the really regrettable instances of untoward fortune was the manner in which, through the maneuvering of politicians, the working force in the of-

fice of the Supervising Architect had to be cut down in 1905, partly because there was no money with which to pay them, but mainly because Congress had abstained from making appropriations for new or partly finished buildings. Both these defects were cured by the "omnibus" Public Buildings bill of June 30, 1906, and though it has been found difficult in a short time and while private offices are full of work, to secure the right sort of men, it is now understood that the office is once more in good working order and busily engaged on the new buildings authorized last June. The magnitude of the work is indicated by the fact that the appropriation actually made was $10,306,600, while the contemplated total cost of the sites and buildings enumerated was $27,569,000. Aside from the partially finished buildings which received fresh appropriations, and the old buildings that are to be enlarged and altered—each class quite large enough to keep a private office of respectable size in full work for a long time—the "omnibus" bill authorized the erection of one hundred and sixteen public buildings, most of them of modest size and importance, as is inferable from the total amount of the appropriation named above, to be erected in towns of no great present size.

NOW it seems probable, so generally has the aspiration for a "city beautiful" taken possession of Americans of perception and interest in such matters, that in very many of the towns where these new United States buildings are to be erected the desirability for a "group plan" will at once suggest itself to the citizens, and so the usual squabble over the site will become more animated and longer drawn out than usual, and perhaps will result in a wiser final selection than if determined by the self-interest of those who happen to have sites to dispose of. It seems to us very desirable that such agitation and discussion should be had, and we should like to promote it by saying so, for, now that our buildings are taking on more enduring form, it is very desirable that the most permanent of them, the public buildings that is, should be in just the right place, not only for the present time, but rightly placed for aspect and convenience so far as the future development of the town can be foreseen. If we ever have a Department of the Fine Arts, this matter of the location of public buildings will be one of the most important of the matters entrusted to its care. As, however, it may be some years before such a branch of government is developed, we think it would be an excellent idea that each bill, single or omnibus, that appropriates money for a Government building in a town below, say, the second rank, should contain a provision that the appropriation is made contingent on the adoption, within a stated time, of a "group plan" approved by the majority of the citizens, the same being endorsed by and filed with the Supervising Architect at Washington.

ALTHOUGH this simple proviso would throw a good deal of work into the hands of the architects and engineers who just now are specializing in the layout and improvement of towns, we should be very willing to see them get the extra work, for it is work that needs to be done and done as early in the history of a place as possible. Moreover, the suggestion is quite in line with some of the conditions already imposed by the central government. Thus, in the act of June 30 five buildings were authorized on the condition that the sites for them should be presented to the Government without cost to it—a most unworthy stipulation, by the way; but if a contingency of this sort may be established in an appropriation bill, surely it would be allowable to stipulate that the site to be used shall be suitable and dignified, not only for the moment but practically for all time.

THE way in which the "group plan" movement is being pushed is instanced by the case of Duluth, Minn., where a Court-house for St. Louis County is in contemplation. The pushing in this instance was quite to be expected, for it was to Messrs. D. H. Burnham & Co. that the County Commissioners turned for the plans of their $700,000 Court-house, and this firm, as everyone knows, is distinctly specializing in work of this character. Besides preparing sketches for the building as desired on the proposed site, the architects also considered the matter in a broader aspect, examined the city, studied its conditions, and then, at their own expense, prepared and presented for consideration a group plan for the establishment of a "civic center." Judging by the reports we have seen, the citizens look on this volunteered work as anything but an act of supererogation and are really grateful. Perhaps nothing will come of it, but we fancy that the scheme suggested is more likely to be adopted than rejected. At any rate, these movements are in the air and from now on we fancy it will be quite a common thing for architects, when invited to prepare designs for public buildings, to take the opportunity to suggest to their clients a general scheme of municipal development.

THE Gallic influence on American architecture is once again strengthened by the appointment of Mr. Jean Paul Alaux as Associate Professor of Architectural Design in the School of Applied Design of the Carnegie Technical Schools at Pittsburgh. Although a Frenchman, he has had American experience—in Pittsburgh, with Messrs. Alden & Harlow, and in New York with several architects—prior to his return last year to Paris to enter *en loge* in the trial to win the Prix de Rome. Prof. Alaux is now actively engaged in his new work with a day class of forty and a night class of some sixty students.

LAST month, George Edward Harding, who, because of failing health, had to retire from a lucrative architectural practice in New York some years ago, died in New Jersey. Mr. Harding was born at Bath, Me., in 1843, and acquired his education in engineering at Columbia College. For many years he had as partner Mr. Wm. Tyson Gooch. Among the notable buildings—most of them of a commercial type—designed by the firm, George Edward Harding & Gooch, are the Postal Telegraph Building, the Cable Building, the Queen's Insurance Building, the Holland House, the Gerken Building and others of size and importance in lower New York.

Modern Steel Buildings[1]

THE first big building in which the idea of a steel frame was used to any extent was the Home Insurance Building in Chicago. This building was erected in 1883. Only 24 years have passed since that time. You can see, therefore, that the whole revolution in modern building construction has been condensed into a space of less than a quarter of a century.

The principle first embodied in that building has completely changed the character of big building construction. But there has been a change not only in the buildings themselves, but in the methods of organizing the architects, the engineers, the contractors, and the artisans, who construct the buildings. Fifteen years ago the erection of an eight or ten-story building was considered a good year's work. To-day a building twenty-five or thirty stories high can be erected within that same length of time. This change is due to improvements in methods of work. The modern construction engineer, engaged in the erection of big buildings, has a business organization which differs from the business organizations of twenty-five years ago, almost as much as the steel building itself differs from its solid-masonry predecessors.

As an example of the rapidity with which a modern engineering force can work, we may take the Sears-Roebuck plant on the west side of Chicago. This plant consists of four large buildings. The largest in the group is ten stories high, four hundred feet wide and sixteen hundred feet long. The total cost of the plant, including all buildings, was more than four million dollars. Yet the whole job was done in eight months. In other words, building construction has not only been changed but accelerated. It is not only different in materials but different in methods. It has not only more steel but more speed.

And, by the way, the speed is just as important as the steel, When an old building is torn down in the heart of a great city, the owner loses his rents from the time when the old tenants are turned out to the time when the elevators begin to carry the new tenants to their new offices. Can the engineer constructor have that new building ready in ten months, or will it take him eleven? The difference of one month is important. There are office buildings which have a monthly rental roll of fifty thousand dollars. That sum represents to the owner the difference between an engineer constructor who can put up his building in ten months and the engineer constructor who cannot do it under eleven. It is therefore absolutely necessary that the modern engineering force should be able to do its work, not only with the utmost care, but with the utmost rapidity. This means that the best type of engineer constructor, in order to be able to handle big building operations, must have in his own office, or else closely associated with him, all the different kinds of talent which go into the construction of the modern skyscraper. In other words, the modern engineer constructor is not an individual. He is an organization.

You will be able to see what I mean if I just name the different kinds of trained men who ought to be included in an engineering force competent to perform a modern building operation with the smallest possible loss of time. An architect; a civil engineer; an electrical engineer; a mechanical engineer; a structural engineer; a sanitary engineer; a fire protection engineer; a purchasing agent; a construction superintendent; an operating engineer; an accountant. For the best work, it is no longer advisable to have all these men in separate offices of their own and to call them in from time to time in an advisory capacity to superintend their particular part of the work. It is better to bring them into what is, in effect, a single organization. They must work like the players in a football game, not as individuals but as a team. And they must have a captain whom they all trust and whom they all obey. He is responsible for every play in the whole game. He directs every movement. But he must have men under him who know their own specialties just as the left tackle in a football team knows how to be a left tackle, or the half-back knows how to be a half-back. The captain can then send that team down the field and have it under complete control and know what every man is doing every second. The difference between the old-style football of fifty years ago, when the players roamed all over the field very much at their own sweet will, and the modern organized football, in which the whole team is under perfect control, and moves like one man, is the difference between the scattered individuals who used to collaborate in the construction of a building fifty years ago, and the modern compact engineering force which brings all those individuals together in one team and which can calculate, almost to the day, the exact time which it will consume in getting a certain piece of work done.

Let us begin now at the beginning and see what happens from the time when a man decides that he wants a new building to the time when that building is handed over to him, ready to be used. We will suppose that our man comes to the office of an engineer constructor of the kind we have been talking about. He explains that he has an old building which will have to be torn down and that he wants to replace it with a modern office building on which he is willing to spend a certain amount of money. He naturally wants as much done with that money as possible. The engineer constructor now proceeds to make a prophecy of that new building, complete in every detail. There are men in the office who can estimate the cost of every particular kind of thing that will be needed. Each man can make a pretty fairly accurate forecast of the expense that will be connected with that feature of the building in which he is particularly interested. The advantage of such a careful estimate of prospective cost is manifest. The owner of the building then knows exactly what kind of building he can afford and just about how much money he will have to spend. This is an advantage which in former days it was sometimes very difficult to secure.

There have been times when an architect would draw plans that were attractive to the owner and that promised a building of a kind that he would enjoy possessing. These plans having been all made and the dimensions and decorations of the building having been decided upon, the different contracts for steel, brick, granite, etc., would be awarded, one after the other. Everything would go on pretty well till one day the architect would come to the owner and say: "Well, I am sorry, but that building will cost three hundred thousand dollars more than we thought it would." In fact, there is one architect who always introduces some humor into the situation and says: "Well, you'd better go out and take half a million dollars more away from somebody. We'll need it before we get through." These things are often quite annoying to the owner. They are avoided when architects and engineers work out the plans together and when the architects can compare their ideas of what would be desirable with the ideas of the engineers as to what is financially possible.

The exactness with which a financial estimate can be made was seen in the case of the new County Building for the City of Chicago. When the plans for that building were being drawn up it was known that there was a certain appropriation for it, and every effort was made to draw the plans in such a way as to make allowance for every possible detail and still keep within the appropriation. Finally after the estimate had been made, and after the specifications for the steel contract, the granite contract and all the other contracts had been printed, showing just what was wanted, the contractors were all asked to come in and bid on the work. When all the bids were in, and when all the contracts had been awarded, it was found that the actual contract cost was only fifty thousand dollars away from the estimate of five million dollars that had been made before any of the contractors had named their price. When building can be done in this way, it saves the nerves of the owner. If the estimate is too high, he can cut his plans and try to satisfy himself with a more modest building. If the estimate is satisfactory he can order the engineer constructor to go ahead.

The engineer constructor must now plan his campaign like a general. He must not allow a moment to be lost. And in order to avoid the loss of a moment he must lay out a complete time schedule for his building to follow. The civilian is likely to imagine that the general of an army simply starts out in the direction of the enemy and wanders along till he finds him. In the same way the man who is not familiar with engineering practice is likely to think that the engineer simply starts building and keeps on building till some day he gets through. As a matter of fact the first thing that an engineer does when he begins a building is to calculate practically the exact day at which

[1]A paper by Mr. John M. Ewen, M. Am. Soc. C. E., read before the Engineering Society of the University of Toronto.

that building will reach each successive stage in its construction. In other words, he writes a diary for that building, but he writes it beforehand instead of afterwards. The table of dates shows the exact stage at which the building is scheduled to arrive on the days mentioned. It gives everybody connected with the construction of the building his cue for coming on and going off. It is the running-time for the construction engineer just as the time-table of a railway is the running-time for the locomotive engineer.

As we go on now with our building we will suppose that the owner wants a building with a steel frame. It is a mistake, however, to suppose that a steel frame is absolutely essential to the construction of a high building. There is one reason, among others, why a solid-masonry building would be unsatisfactory to the modern owner. The walls of such a building have to be extremely thick. They must be immensely broad and strong in order to support the weight of the structure. The consequence is that a great deal of space that might be used for offices has to be used for walls. If such a building had a steel frame, the walls would be so much thinner that the floor space, capable of being devoted to offices, would be increased by 25 per cent. Obviously it is to the advantage of the owner to build with steel. The old County Building, Chicago, furnished us with an illustration. The walls of this building were twenty feet thick at the first floor. The walls of the new building, which is steel construction, at the first floor, are only three feet thick. The saving in floor space is obvious.

There is also another reason for preferring steel-frame buildings of the most modern construction to buildings of the old type. This second reason is their superior safety.

Masonry by itself, or slightly and imperfectly supported, cannot sustain a severe shock or jar of the kind given by an earthquake. This was demonstrated in the San Francisco disaster, where buildings of the old type tumbled down, while the steel frames of the modern buildings were practically intact after the earthquake and after the fire. The reason is to be found in the method of construction. The steel columns and beams were so firmly fastened together with rivets and so strongly braced that the whole frame-work was practically as stiff and rigid as a steel cage. The masonry walls were carried on the outside steel beams and were tied to those beams with strong iron anchors at every floor. Finally another precaution was added. Under the window sills of each story a flat band of iron about five inches wide, and a quarter of an inch thick, was laid in the masonry and carried all the way around the whole building. This band of iron is riveted to the columns as it passes them and acts as a horizontal support for the masonry. The whole building could actually be tipped several feet out of a vertical line without endangering its integrity.

For reasons of safety, therefore, as well as the desire to get more floor-space, the owner of the prospective office building is likely to want a steel frame.

The plans made by the engineering force for the new building will now show exactly where every piece of material is to be put. When the building is completed the thing that seems remarkable is its size. When it is being built, the thing that seems remarkable is its infinite number of small details. All these details are represented in the plans. These plans, specifications, blue prints and documents of all sorts multiply at an astonishing rate. If they were all brought together in the case of a building like the Cook County Building in Chicago, and put on a scale and weighed, they would tip the beam at something like thirty tons. At this stage it is not the big work of engineering practice, but the small work, that attracts the eye. On the tables in the architects' and engineers' offices, where the plans are kept, they give a complete picture of the building which has not yet been begun. The smallest piece of steel that goes into a column up on the fifteenth floor of the building is already in its place, its exact place on the plans. The building exists completely in imagination before a single stone has been placed in the foundations.

The engineer constructor, if he is in complete charge of the building, will now proceed to let the contract for tearing down the old building. The contractor who does the job of taking it away will make good use of all the usable materials it contains. He will have a big yard or warehouse in which the steel, the iron, the stone, the bricks and the other materials will be sorted out and heaped up and sold to people who can use them. In some cases the stone from the old building is crushed on the spot and mixed with sand and cement to make concrete to be used in the new building.

While the old building is being battered down and carted away, other contracts are being let. It was formerly customary to follow up the demolition of the old building immediately with the excavation of the space for the foundations and basements of the new building. It is now feasible, however, to do the foundation work before doing the excavating. This seems like a contradiction in ideas. But the process is comparatively simple. And it saves a great deal of trouble.

If you follow the old method and dig the big hole in the ground before you lay your foundations you have to support the sides of this hole with long, strong timbers, and you are constantly worried by the fear that some of these timbers may slip and break and that the building next door or the pavement of the street may feel the jar and may be more or less seriously damaged.

Suppose, for instance, that the building has been torn down, and that you have proceeded to make a large excavation. You can readily see that it is necessary to take great precautions in order to protect surrounding property from injury. Instead of taking this risk, you may, if you please, allow almost all the dirt to remain in place and get your foundations all in before you dislodge it.

You begin by digging a trench along the sides of your lot. The sides of this trench you support with horizontal planks which are braced apart by screw braces. Finally, when the trench has reached the desired depth of your lowest basement, you put in a concrete base at the bottom of it and install vertical steel beams all the way up the middle of it from bottom to top and brace these beams with jack-screws, set between them and the planks which still form the sides of the trench. The pressure from the street and from the earth and the buildings surrounding your lot is now transmitted across the trench through the planks and the jack-screws, and the steel beams, and is now successfully resisted by the big core of earth which you have left still occupying the whole center of your lot.

You are now ready to dig the wells for your caisson foundations. At various spots on your lot, that is, wherever you intend to have a steel column for the support of your building, you begin to make a round hole. The rest of the earth on the lot remains unexcavated, just as it was. All the excavating you now do is simply for holes which will afterwards be filled with concrete and used to support your steel columns.

The depth to which you dig these holes will depend upon the size of the building and the character of the soil. In Chicago you may choose between two different levels. One is hard-pan. The other is bed-rock. The first is found about sixty feet below the surface in the down-town district. The second is not reached till you have gone down one hundred and ten feet. In the case of a large building it is usually advisable to go all the way down to the second level.

As these wells are dug they are lined with heavy strips of wood, called lagging, and they are further protected by the insertion of metal rings which keep everything steady and transmit all pressure from every side. The digging is usually done by hand, with shovel and pick, and is good, hard work, especially when the laborers get down toward bed-rock. Recently, in a caisson well six feet in diameter, two men worked for eight hours and made only eight inches of progress.

When the wells have finally reached the requisite depth, they are filled with concrete to the level at which the bases of the columns are to be set. The bottom of the well has previously been somewhat enlarged, or "belled out," so as to transmit the weight of its load over a large area. The rest of the well is of the same diameter throughout.

These columns of concrete are commonly called caissons, though they do not, strictly speaking, deserve that name. The word caisson, in engineering practice, really refers to a foundation which is made under water by men who are working in a chamber filled with compressed air. Caisson disease is the disease which men get through breathing the compressed air in a chamber of that kind. Our caisson wells in Chicago are not built under compressed air at all. They are simply dug with a shovel and pick, just in the same way in which any ordinary excavation is made.

General William Sooy Smith, a famous American engineer, recommended the use of what we now call caisson foundations at the time when the Masonic Temple was built twenty years ago. At that time the idea was not thought feasible. Later, however, it was tried in the Stock Exchange Building of Chicago, and it soon began to win its way into favor.

Of course, the other kind of foundation is still used. In many

cases long piles are driven down into the ground and the building rests on them. Care must be taken, however, to see that the heads of the piles are driven down below the water level. Otherwise they will rot.

In other cases the foundations consist of what might be called rafts of steel beams, placed closely together, and set in concrete. These raft foundations, or floating foundations, support the columns which in turn support the floors.

One disadvantage about pile foundations and about raft foundations is that they settle when the weight of the building is imposed upon them. It is therefore customary in such cases to build the first floor of the building several inches higher than it ought to be, and then wait for the whole structure to settle down to its proper level. In some places in the down-town district of Chicago you will notice that the sidewalk slopes from the building to the street. This means that the building did not settle as much as its builders thought it would. In other cases the sidewalk slopes the other way. That means that the building was made heavier than was expected and that it settled too much, so that the slope of the sidewalk is toward the building from the street.

Another disadvantage about raft foundations is that they take up a great deal of space. Sometimes they even extend over into the next lot under the adjoining building.

A case of this kind was once carried to the Supreme Court. It was a dispute between Mr. Field and Mr. Leiter. Mr. Field won. The Court decided that he had the right to extend his foundations into Mr. Leiter's property. I was connected with the controversy in the interests of Mr. Field, and it became my duty to go to Mr. Leiter with the necessary drawings and show him exactly what we intended to do. There was to be a floating foundation 26 feet wide, thrusting itself under the party wall and resting half on Mr. Field's property and half on Mr. Leiter's.

Mr. Leiter studied the drawings carefully for a long time and then said: "Well, what shall I do if my neighbor on the other side should wish to perform the same kind of building operations as Mr. Field? He would want a similar foundation of the same width, 26 feet, and would naturally want thirteen feet of my land. This would make 26 feet of land that I would be obliged to furnish. Now, as I have only 25 feet, do I not run the risk of being sued for not having land enough to accommodate my neighbors?"

(*To be continued.*)

Fifty Years of American Architecture[1]

FOR many decades the men and women who inherited the riper conditions of living set the pace and kept the lead. The boisterous democracy which poured into Washington with President Jackson, and stood on the sofas of the White House in muddy boots, had not yet taken building and sculpture into its own hands. There were churches which charmed the eye and conveyed a sense of their uses to the mind in Portsmouth, Newport, New York, Wilmington, Charleston; and there were houses which happily harmonized material and form, and were suggestive of social background and vistas of an older social order, in Salem, Boston, Providence, Bristol, Newport, New York, Philadelphia, Germantown, Annapolis, Richmond, Charleston, and smaller towns. Colonial architecture at its best suggested a good tradition and expressed an honest fact; it expressed history and a sound relation to the soil. It had that ultimate elegance, entire simplicity, which was characteristic of the best colonial life, and that dignity which was the stateliness of the Old modified by the conditions of the New World. The churches built under the inspiration of Sir Christopher Wren, and the fine old homes of which the Sherborne house in Portsmouth, the Jumel mansion in New York, and Mount Vernon may serve as examples, bore the impress of a certain distinction of taste and form which were the heritage of the few, but of inestimable importance to the many, as examples of true American architecture. They were as vitally related to their surroundings as are the gray old great houses of England and the square-towered country churches to the low skies and deep foliage of the ripe and mellow landscape. They constituted, with the Capitol at Washington and a little group of public buildings like Independence Hall in Philadelphia, a native order of building, adapted, it is true, but not imitative. They stood for Provincial America, with its face turned eastward, and still bound to Europe by kinship if not by identity of standards and interests.

Architectural chaos came much later, but the empire of the commonplace had been established in all parts of the country for several decades before the *Atlantic* began to stir the waters of national consciousness. American writers had been telling the truth for many years before later American builders began to do anything more radical than mumble a few commonplaces; when they started out to speak for themselves they made sad work of it. To begin with, they did not speak the truth; they were ungrammatical; worst of all, they were vulgar. During the period which followed the Civil War, and has been aptly called the reign of terror in American architecture, crimes against stone, wood, iron, and form of every kind were perpetrated, which still cry aloud for vengeance. It was in this period that post-offices and other federal buildings were sown broadcast over a helpless land, and ugliness in almost unbroken monotony was set up as the symbol of public life. There were a few redeeming exceptions, but for the most part, the State buildings of this period were monstrous offenses against public morals and public taste. This was the period, too, of the so-called reconstruction policy, which was such a shocking parody of the sublime tragedy of the Civil War; and it is significant that shining deeds of valor, and heroes whom youth and death had touched with a double beauty, were commemorated at this time with monuments and statues, of many of which it is merciful to write that they were executed not in malice, but in ignorance. Never before, perhaps, has a great sacrifice found such meaningless expression in monumental form, and it will be the pious task of a later generation to raze many of these monuments to the ground, and worthily commemorate a sublime chapter of national history.

During this lawless period all sorts of hybrids were brought to birth, and many still remain to remind us of our mortality: houses so entirely made with hands that no suggestion of mind flows from them; Italian villas (pronounced with a long I); stone castles with colonial additions; Elizabethan mansions with late Victorian piazzas and verandas; structures of no order but with vast cupolas; and, worst of all, riotous variations of that shamefully abused Queen Anne house, which, in its proper form and place, has a real relation to domestic life and to beauty of adaptation.

This outbreak of anarchy in building, this fierce passion for extreme individualism in construction, need not discourage the American who has seen the imperial palace at Strasburg, the atrocities of the *art nouveau* in the streets of Berlin, the bizarre villas which rival the zebra in the sunny fields of contemporary France, and the new government building on Whitehall in London. What we did in our ignorance Europe is now doing in the presence of the noblest examples of the art of building. We, meantime, have repented our sins and, sitting in sackcloth and ashes, are beginning to understand that architecture is not a highly decorated front wall, attached to a structure to which it bears no more relation than the mask of a Greek actor bore to the man, but the art of building honestly, intelligently, with a sense of mass, proportion, surface, and shadow. It is true we are building the Tower of Babel again in many places, and a confusion of tongues has fallen upon us, so that the owner does not understand the architect, and the architect does not understand the opportunity, and the crowd of passers-by spend their energies in trying to count the stories and keep their hats on their heads while they are doing it. The task is a gigantic one, imposed by the enormous value of land in great centres, and by the pressure of population; but it is novel only in the new conditions it presents, not in unprecedented problems of altitude. One need only recall the wynds of Edinburgh and the beautifully decorated front of the old house of the Butchers' Guild in the square of Hildersheim to be made aware that the skyscraper is no modern nightmare of frenzied commercialism. Here and there one sees solutions of these problems, which are not mere masses of masonry for the housing of business, but highly organized structures, with new suggestions of the majesty of an art whose great function is to assert the sovereignty of the builder over every form and mass of materials. In all the larger cities there are

[1] Abstract of a paper on "Art: 1857-1907," by Hamilton Wright Mabie in the November "Atlantic."

private houses of a beauty and fitness which make one aware that wealth of the newest kind has learned where to go for direction, and the sense of public outrage created by the attempt to reproduce a log house in stone in New York, and to raise it to a height of seven or eight stories, bears eloquent testimony to the education of taste, which has led us out of the reign of terror into a kind of anticipatory reign of righteousness.

There was admirable building in the colonial and sub-revolutionary period; then came the age of the commonplace and the monotonously undistinguished, to be followed, after a great national crisis, by an outbreak of self-assertion, which was anarchistic in its wild and truculent disregard of authority, principle, and law; a flamboyant declaration of the right of the free American citizen to make his country as ugly as he chose; a riot of ignorance, bad taste, extravagance and crude independence.

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Nor must it be forgotten that in the darkest days of marble palaces with painted iron columns, and of bastard Queen Anne cottages rising sanguinary and ostentatious above diminutive lawns, builders who were also architects, or architects who were also builders, as in the "elder days of art," were patiently trying to persuade their clients that building was an ancient art, and not a local job, and that an increasing number of those who were teachable in those matters made life more tolerable in prosperous communities. The remnant of the elect increased not only in knowledge, but in influence, and the statement by a well-known architect that American architecture is the art of covering one thing with another thing to imitate a third thing, which, if genuine, would not be desirable, began to lose point. Upjohn, Renwick, Hunt, Richardson, Root, and White suggest a movement in education, and a genuine achievement in an art which, more than any other, ought to have in this country a hand as free as its opportunity is great. If vagaries are still seen in stone, wood, and iron, and if the ready adapter and servile imitator are still in the land, there are increasing evidences of the presence of the artist and of the patron who is wise enough to give him his chance.

German Administration of Building Land

A GOOD example of the scientific manner in which German municipalities attack administrative problems is shown by their housing policy. Germany, like Britain, has gone through an industrial revolution, and is changing from a nation of agriculturists to one of urban manufacturers. Hence, precisely the same problems of overcrowding, and the consequences which overcrowding brings, present themselves. Germany, however, is unlike Great Britain in having recognized that her industrial prosperity depends upon the maintenance of a healthy population, and has set herself to secure this by a municipal housing policy with a persistent and scientific thoroughness unknown in this country. Owing to the fact that local authorities in Germany have a freer hand than have similar bodies in England, the details of that policy vary from town to town and State to State. The essential characteristic everywhere, however, is that German municipalities do not consider it their duty simply to meet the evils of overcrowding when they are so conspicuous as to be intolerable, but to form plans in advance which shall, as far as possible, prevent those evils from arising. On the ground that prevention is better than cure, they are continually planning and adopting schemes which in this country would be described as "ambitious" or "unnecessary," because they show the same forethought as would be required by shareholders from any board of directors of ordinary competence. There are three main lines along which municipal action with regard to housing has proceeded. The first is concerned with the acquisition of land, the second with the regulation of building, the third with taxation. A German expert who visited England some time ago remarked that the primary need of our towns was the adoption of a far-seeing land and transport policy by local authorities, and added, "In that respect our German communities are in a far more fortunate position." How that more fortunate position has been brought about may be gathered from a Prussian decree as to housing of 1901, which urges that all municipalities shall, in the first place, retain in their own hands all the land which they possess, and, second, purchase more land whenever it comes into the market. "The evils which at present prevail have their chief source in an unhealthy speculation in land [*i. e.*, because such speculation raises rents]. . . . An effective remedy for keeping it within bounds can be found in the acquisition of as many plots of land as possible by those towns where constant growth is transforming agricultural and garden land into building land . . . it will certainly be in conformity with a sound land policy if even towns in which a house famine exists do not sell outright those parts of the land they own which are suitable sites for cheap dwellings. . . . The community should keep the right of pre-emption or some other adequate security that the plots of land will be permanently withdrawn from private speculation." The effect of this decree was analogous to a circular letter from the Local Government Board specially requesting British municipalities to buy land whenever they saw an opportunity of doing so. That the policy recommended is popular with local authorities is shown by the large amount of land held by many of them. Thus six towns own from 23 to 59 square yards per head of inhabitants; nine towns, including Berlin, from 60 to 120 square yards; five towns from 120 to 240 square yards. In the words of the Minister of Commerce of Hesse, which has established a national credit bank to lend money to towns acquiring land, "the early purchase of land in all parts of the country must be regarded as the first duty of towns."

When land cannot be acquired voluntarily the question arises whether expropriation should not in one form or another be sanctioned. The importance of giving municipalities the power to acquire land by compulsory purchase, when it appears desirable to do so, is not so necessary in Germany as in Britain, owing to the fact that the policy of voluntary purchase has there so long been in operation. Nevertheless, the powers possessed by German municipalities are considerable. The Saxon law confers on municipalities the power to compel an owner who hinders the laying out of streets or the creation of an orderly building plan in suburbs, by refusing to part with land, to surrender his plot in return for a similar plot elsewhere. Thus suppose the owners of five-sixths of a district suitable for houses want to build, and are prevented by one who holds an essential piece of ground in the center or at the corner, and who refuses to sell it or build on it, they can appeal to the municipality to compel him to part with the land. In addition to this power of land redistribution, Saxon municipalities can, with the approval of the Minister of the Interior, compulsorily purchase land, not only, as in this country, to meet a specific and immediate need, but also when, on general grounds, such purchase seems likely to be in the public interest. An example of this policy is supplied by the town of Düsseldorf, which has recently incorporated a large area of surrounding country by purchasing it from the State or from private owners. "If," it stated, "a private owner is unwilling to sell, the town applies to the Landtag (*i. e.*, the State Government), and if it can show that possession of the land is necessary for the welfare of the town, the Landtag compels the owner to sell." The practical effect is to enable a community to regulate its growth in accordance with a preconceived plan.

Such regulation can, however, be achieved without actual ownership by the system of "building plans," or "building zones," which form an important part of the housing policy of German municipalities. The essence of this system is given in the words of the Prussian Dwellings Bill of 1903: "To prevent the price of land in and near towns from being raised through the town's extension plans not being prepared early enough, the local police authority must have the right to demand that building lines shall be decided on, and that streets or parts of streets shall be constructed. In the preparation of building lines care must be taken that squares, sufficiently numerous and large, and public gardens and playgrounds are provided for." That is to say, before any district as yet unbuilt upon is laid out for building, the local authority must prepare a building plan. This plan, which is ready perhaps several years before operations actually commence, specifies within what areas houses may be built, the lines of the streets, and the spaces to be reserved for public or private gardens, as well as the height of the buildings and their distance from each other. It would be tedious to give the details of these regulations, but their far-reaching character can be seen from what has been said. Their effect is not likely to be underestimated by anyone who compares with the squalid suburbs of London or Glasgow the way in which open spaces and breathing-room between house and house are preserved in the neighborhood of the larger German towns. Instead of the growth of an old city reproducing new slums around it, as is done by the manufacturing towns of Great Britain, where buildings are erected without regard to posterity, and, of course, without a thought to beauty or pleasantness of life, the system of building plans

introduces an orderly and regulated growth, based upon a reasonable forethought and the use of scientific knowledge which was not within the reach of our grandfathers.

Finally, there is the question of rating. The principle that land which is capable of being used for building must not escape with a low rate simply because its owner chooses to put it to a less productive use, or to no use at all, has been accepted by a large number of towns, and formed the subject of a recommendation made by the Prussian Finance Minister in 1899 to those towns which had hitherto not adopted it. So far from being a device adopted by greedy municipalities, the system of rating land according to its selling value has received the imprimatur of the Prussian Government, which has prepared model by-laws for the guidance of such town councils as cared to adopt them. The effect, it is argued, is to tap the unearned increment received by persons whose land appreciates in value simply because the community's need for it is becoming imperative, and to discourage land speculation. It would be out of place here to enter upon the merits of such a policy; but it may perhaps be pointed out that the question which of the various interests united in a site bears the burden of a rate on site values—a question which is dear to lawyers, and which is not answerable with any certainty—does not affect, however it is answered, the expediency of throwing the burden of rates onto sites rather than onto buildings. Frankfurt-am-Main has, indeed, gone unusually far in its attempt to get at the unearned increment. When real property is sold it levies a rate upon any increase in the value of the property over that shown by the last valuation. No rate is charged on an increase of less than 30 per cent., 5 per cent. is charged on an increase of from 30 to 49 per cent., 10 per cent. on an increase of from 50 to 74 per cent., and 20 per cent. on an increase of 74 per cent.—*The Architect.*

Outdoor Advertising in France

THE first enactment relating to the subject of outdoor advertising in France is a law dated July 28, 1791, which is still in force, and prescribes that only a Government poster or announcement may be printed on white paper; all others must be on colored paper—red, blue, yellow, etc. Every poster or other announcement painted, printed, or otherwise, delineated upon a wall, building, or upon canvas is subject to a yearly tax. Temporary *"affiches"* or posters are subject to a stamp-tax, according to size. This is attached either in the form of stamped paper, on which the revenue stamp is applied to the sheet before being printed in such way that the stamp is cancelled by the text being printed over it, or it may be attached adhesively afterwards, and cancelled by a rubber stamp provided for that purpose. Before, however, being publicly displayed, each poster is required to be presented in duplicate at the office designated for that purpose, dated and signed either by the person in whose interest it is prepared or by the bill-poster who is charged with posting the same. According to the American Consul-General in Paris, such antecedent declaration must state fully (1) the text of the poster; (2) the name, surname, profession, and domicile of the person in whose interest it is to displayed; (3) the dimensions of the poster; (4) name, surname, and domicile of the bill-poster who is to post it in public; (5) the number of copies to be posted; (6) precise information as to the streets or squares, houses, or other constructions on which the poster is to be displayed, and (7) the length of time during which it is to be kept in view. One copy is filed at the office of registration, the other—signed and stamped by the official in charge—is returned to the applicant. It will be obvious that a system so rigid and elaborate as this gives the authorities of every village and commune in

COMBINED BOAT-HOUSE AND CHILDREN'S PLAY-HOUSE; RESIDENCE OF W. B. DINSMORE, ESQ., TUXEDO PARK, N. Y.

Donn Barber, Architect.

France absolute control of all posters and announcements displayed in public places, and practically suppresses the abuses which prevail in that respect in certain other countries. No one is permitted in France to deface streets and public places with crude, ostentatious announcements of his business or other subject. Bill-boards are infrequent in Paris, and are generally built permanently into a wall, where they are taxed according to their superficial area. When a building is in course of construction and board screens are erected to shield the public from dust and other annoyance, such temporary screen will soon be covered with posters of amusements and other matters, but each poster so displayed has been previously submitted to the authorities, a license obtained, and each sheet bears the cancelled revenue stamp, according to its size. The department-stores and other large popular retail establishments have permanent places in the stations of the underground railway, and their colored posters which are there displayed are in good taste, and often interesting as works of decorative art. The walls of market-houses bear permanent framed bill-boards for the display of administrative announcements. Agencies for the sale of theater, opera, and other amusement tickets are permitted to display colored announcements of such performances inside their windows as posters, but the promiscuous placarding of patent medicines and drinks, on houses, fences, and dead walls is not permitted in France. There are in Paris various classes of kiosks or street structures which are devoted to advertising or bill-posting, for example (1) round towers known as the "Colonnes Moris," made of wood, and used mainly for posters of theaters and other places of amusement. This is the oldest form of kiosk in Paris, and comparatively few of them are now in use except on the leading boulevards and avenues. (2) The "Poste de Vigie" or policeman's kiosk. This is an hexagonal kiosk used as shelter by the policeman whose post is adjacent to the more important cab-stands. Its panels of wood or glass are used for the more permanent class of business advertising, which is printed on the glass or posters covered by glass frames. (3) The news-stand kiosks serve as a shelter and depot for dealers in newspapers and magazines whose stock is usually displayed on shelves or tables under a tent or awning set up otuside the kiosk. In Paris, kiosks of this class are common throughout the city. They are substantially built, and their panels serve for the permanent display of a large variety of advertisements. Electrical signs are permitted and used to some small extent in Paris, but not so generally as in Berlin, London, and some other European cities. For each sign of this class of public advertisement a special permit must be obtained from the prefecture, and the tax thereon is regulated by the size and character of the sign to be displayed.—*Journal of the Society of Arts.*

ILLUSTRATIONS

TENNIS AND SQUASH COURTS BUILDING FOR COL. JOHN JACOB ASTOR, RHINEBECK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS.

The building is erected on a high bluff above the Hudson River and commands extensive and beautiful views across and up and down that stream. It is, of course, intended solely for the entertainment of the owner's guests and to provide a place where tennis may be played at all seasons. The outer walls are of stuccoed brick; the foundation of rubble stone; the roof is of Bangor slate. The reception-hall has a carved stone mantel with touches of gold in its ornamentation. The living-room has a circular bay overlooking the Hudson and much dark maroon is used in its coloring, which makes a pleasing contrast with the palms which form an important part of the interior decoration of the building. The tennis court has a floor of earth, steam-rolled to a very perfect surface; its upper walls are of Guastavino construction, with steel trusses supporting the skylight above. The room containing the swimming-pool is lined with marble up to the springing-line of the groined arches and floored with the same material. The pool or plunge itself is lined with white glazed tiles, and the water which supplies it is pumped from the river into a detached and elevated filter from which it passes by gravity to the basement, where it is heated to any desired temperature before being delivered into the pool.

HOUSE OF W. B. DINSMORE, ESQ., TUXEDO PARK, N. Y. MR. DOUN BARBER, ARCHITECT.

The house is built near the lake shore on a well-wooded side hill which slopes to the water's edge, as is shown in the general view and in the view of the attractive little building serving as a combined boat-house and children's play-house.

The first story and basement of the residence are of stone and the upper exterior walls of hand-split cypress shingles, stained in varying shades of brown.

The hall and living-room are finished alike with beamed ceilings of oak and a high wainscoting. The dining-room is trimmed in dark mahogany, with furniture of Colonial pattern. These three rooms have carved stone mantels. The reception-room is in Louis XVI. style, with ceiling and walls of ornamental plaster of warm gray tint and with a mantel of carved marble. The bedrooms are finished in white enamel.

HOUSE OF MR. SLOMAN, DETROIT, MICH. MR. ALBERT KAHN, ARCHITECT.

HALL IN RESIDENCE OF WALLACE H. ROWE, ESQ., PITTSBURG, PA MESSRS. RUTAN & RUSSELL, ARCHITECTS.

Additional Illustrations in the International Edition.

MANTEL IN RECEPTION-HALL: TENNIS AND SQUASH COURTS BUILDING FOR COL. JOHN JACOB ASTOR, RHINEBECK, N. Y. MESSRS. M'KIM, MEAD & WHITE, ARCHITECTS.

ENTRANCE: ELECTRA HOUSE, LONDON E. C., ENGLAND. MR. JOHN BELCHER, ARCHITECT.

NOTES AND CLIPPINGS

COLLAPSE OF THE SANCTUARY OF THE CRUCIFIED AT BOCA.—The great Sanctuary of the Crucified at Boca, in the vicinity of Novara, whose dome towered to a height of nearly 300 feet, has suddenly collapsed owing—it is said—either to a recent unsettlement through a lightning stroke, or from over-pressure upon the main walls. It is one of the richest and costliest modern pilgrimage shrines in Northern Italy, covering an area of 4,000 metres, and enclosed a tiny sixteenth century chapel containing the supposed miraculous image of the Madonna. Remarkably enough this ancient shrine stands intact amidst the mountain of shattered marble columns and masonry. The outer basilica was designed by the famous architect Antonelli, who reared the Antonellian Mole at Turin. The basilica of Christ crucified has been in course of erection since 1822, enormous sums having been lavished on its decoration. The damage is estimated at above a hundred thousand pounds. King Victor Emmanuel recently motored to the scene, and expressed great sorrow on learning that there was no prospect of reproducing this fine specimen of modern art.—*The British Architect.*

DECAY OF STONEWORK OF COLOGNE CATHEDRAL.—The Berlin correspondent of the *Globe* says: For some time past the authorities responsible for the beautiful cathedral at Cologne have been aware that the outside of the building showed clear signs of the rotting away of the stone. Professor Kaiser, of Giessen University, was called in lately to report upon the case. He attributes the gradual destruction of the cathedral to the immense quantity of sulphuric acid in the air of the city. The outside of the cathedral will have to be repaired without delay and at an immense cost.

CONSTANTS FOR ESTIMATING.—In a paper on "Estimating" published in the *Builder,* Mr. A. C. Passmore says that the approximate value or percentage of each trade to the total of the estimated cost of work may be approximately calculated by multiplying the total of the estimate by the constants given in the following table, which is for ordinary work only. In difficult work, or that with any elaborate detail, or where one trade is greatly in excess of the other than usually, the constants must, of course, vary according to materials and class of work, and also for very small jobs, or those less than $5,000.

Excavator	.005	Plumber	.068
Drains	.010	Gasfitter	.010
Concrete	.013	Paperhanger	.009
Brickwork	.205	(Electric)	.007
Boundary walls	.059	Glazier	.009
Masonry	.014	Painter	.027
Slater	.046	Bellhanger	.007
Tiler (roof)	.046	Laying out ground roughly	.004
Tiler (floor)	.019	Levelling site	.001
Carpenter	.086	Depreciation of plant	.004
Joiner	.286	Sundries—	
Ironmonger	.014	Insurance	.003
Smith and founder	.045	Expenses—	
Plasterer	.058	Water, etc.	

The American Architect and Building News.

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The New York Public Library: Ten full-page plates, supplemented by many text cuts.

BECAUSE modern building operations involve such large sums of money and, through the mediation of building-loans, have such direct connection with the money-market, it happens that the building industries are peculiarly sensitive to changes in the general financial conditions of the day. In times of panic and commercial distress the attempt to come to a halt is made earliest perhaps in the building industries, and, most unfortunately, these same interests are among the last to revive after the time of stress has safely passed. Architects, builders and purveyors and manufacturers of building supplies who have lived through earlier panics must have watched with grave apprehension the varying phases of the present financial disturbance, and must have cast about in their own minds in search of some way to "steady the market." The trouble is too widespread for any given group of men to cope with it effectively, but so far as the building industries are concerned the *deus ex machina* has been found, and has spoken promptly and effectively. It would be difficult to devise anything which would more effectively steady the building market than the announcement that the United States Steel Corporation will refuse to cancel a single one of the contracts to which it is a party. It will, perhaps, in certain cases delay or consent to extension, but it makes it plain that it proposes to be the judge of the conditions. This step advises plainly the timid, or, as he may believe himself, the conservative man embarked in a building undertaking, whose first thought would naturally be to call a halt and cancel his contracts, that he must abide by his agreement or stand suit for breach of contract, his opponent being a corporation able and willing to carry every suit through all the courts if needed. This simple and sensible warning will do much to snub the drift of many a bark before it reaches the rapids and whirlpool of panic.

TWO incidents have occurred recently that direct attention to the usefulness, or the reverse, of municipal art commissions and cognate bodies, bodies which are a little apt to forget that the tree of knowledge fruits eternally, and that the fact that they have eaten thereat to their own great satisfaction is no proof that others may not have feasted there to as good or better purpose. The first case is that of the site for the Grant Monument at Washington, which the commission in charge of the matter decided should stand in the Botanical Garden in conformity with the general scheme established by the Senate Commission for the Improvement of Washington. Unfortunately, the proposed site was already occupied by a collection of trees of assorted kinds either planted by or planted in commemoration of dead and gone public men of note, and a foolish but strenuous attempt was made to prevent the placing of a great monument in an appropriate position to avoid the sacrilege of removing or the risk of transplanting a few trees. The Washington Chapter of the American Institute of Architects has, very properly, passed resolutions on the subject of the location of this monument. These resolutions fully endorse the Park Commission's plans and lay great stress on the desirability of retaining the vista treatment of the Mall. There is more or less sentimental objection to the removal of trees, the objectors apparently forgetting that removal does not necessarily entail destruction; for modern experience teaches us that large trees may be transplanted without serious injury at moderate cost. But such things should surely not be allowed to stand in the way of a great scheme of development which is strongly recommended by men well qualified to judge, and which is, moreover, in line with the original plan of L'Enfant.

THE second case concerns the new building for Police Headquarters in New York, where the Municipal Art Commission has suddenly awakened to the fact that certain statues and sculptured decorations have been placed on the building without having been submitted to it for approval, and, what is worse, this work has already been paid for by the city. The Art Commission finds itself in the uncomfortable position of either approving now, simply because it has been paid for, something it may not really like, or of obliging the city to pay twice for essentially the same result in the case it finds itself quite unable to approve and accept the statuary and sculpture now in place. The architects, Messrs. Hoppin, Koen & Huntington, say that they have offended unwittingly and that as

their design for the building had been submitted to and had been approved by the Art Commission, they imagined they had done all that the law required. The contractors, for their part, show that they have exactly complied with the conditions of the contract provided by the city and that this contract did not, as such contracts usually now do, contain a reminder in the shape of an extract from the charter provision that authorizes the Art Commission to watch over certain kinds and forms of artistic expression. In this particular case the architects were obliged to remodel their design so as to bring its cost within the limits of the actual appropriation, and are understood to have made the greater part of their saving of nearly a quarter of a million dollars at the expense of the decorative treatment. As in order to give the building a reasonable decoration, in keeping with its size and dignity, it was found necessary to employ modelers and carvers who were willing to do the work for the money that could be paid, it is only natural to infer that the work itself is not just the sort of work that an Art Commission would be likely to prefer. It is a very delicate situation, and we trust the Art Commission will remember that the tree of knowledge fruits perennially and for every one. Moreover, we have very grave doubts whether those who formulated the charter provisions really intended that the Art Commission should undertake to direct and control the architect in the execution of the details of his design. If they did, it would, as we have before pointed out, be easy for an autocratic Art Commission to compel architects of all standings to carry out its own ideas as if they were mere draughtsmen.

NOT very many years ago an architect having to place an inscription upon a public building of his designing would hardly have thought of having it expressed in any other than a Latin form, usually abbreviated in the most cryptic manner, and to accomplish it would seek the aid of the Professor of Latin at the nearest college. Now fashion and good sense require that inscriptions should be in English, and the wise architect seeks the advice of such masters of epigraphy as President Eliot of Harvard University. The abandonment of Latin inscriptions is likely to be promoted by the discovery of an amusing piece of illiteracy in connection with certain statuary on the new building for the Department of Agriculture at Washington. The Secretary, claiming to be ignorant of Latin, asked why certain statues were labeled "Flores," "Cereales" and "Forestes," and on being told they were the Latin for flowers, grain and woods, fortunately said he did not see why English was not good enough and ordered the titles to be recut, and in so doing did away with a curiosity that it would dignify to speak of as hog-Latin. But in commonplace and everyday inscriptions architects are thoughtless, and it may be well to point out that in these days of the automobile and much locomotion it is not enough to label a building "town-hall" or "library," as the case may be. The name of the town should be prefixed in every case, not only for its informing value to the automobilist who may wonder which of a dozen towns on his itinerary he has reached, but because it adds to the dignity of the inscription and emphasizes the fact that it is public property.

THOSE who studied the comments of the many eminent architects who, in our issue of May 4 last, expressed opinions as to the use of concrete in architectural work must have noted how frequently they deplored its generally cold and disagreeable color and suggested either the actual hiding of the surface by a veneer of some other material or the enlivening of it by decorations in tile or terra-cotta. It is, of course, the color of the ordinary Portland cement which is at fault—a color so pronounced that it remains obtrusive even when care is taken to provide an aggregate that will tend to correct it. We are now informed that a Portland cement equal in strength and hardening qualities to the best ordinary Portland, but pure white in color, can be commercially supplied. If the manufacturers' claims are substantiated in practice, architects will be able, by the use of permanent pigments, or by careful choice of aggregates, to produce some interesting color effects in the exterior walls of concrete buildings.

THE sombre list that enrolls the names of architects who, succumbing to nervous strain and exhaustion, at length sacrifice their own lives is increased by the name of Louis H. Gibson of Indianapolis, who gave up his life in that city last week. Ordinarily we let such occurrences pass unrecorded, but Mr. Gibson was a man of such capacity and yet of such marked peculiarities that we can hardly avoid speaking of his death or escape the feeling that here was a case of predestination, and that the final act if deplorable was unavoidable. We recall him well when a student at the Massachusetts Institute of Technology, a capable student, but reserved, retiring, unsociable, and with an expression about the eyes that made one always wonder what thoughts the brain was conceiving. It was a very capable brain, as must be acknowledged by those who remember the journal *Stone,* which for several years he edited, and by those who have read the papers which at one time or another he read before various professional bodies.

WHEN the fire-house that stood near the northeast corner of City Hall Park in New York was destroyed, people of taste had visions of a time when the Tweed Court House and the small brownstone building to the east thereof would also be razed and, their sites occupied by lawn and trees, the park would again become a proper setting for the beautiful old City Hall. Instead of this, further defacement of the park is at this moment threatened. We understand that, at the suggestion of the Finance Department, it is proposed to erect where the fire-house stood a two-and-a-half-story brick building to provide additional court room. It is said that the building is to be a "temporary" one but as the estimates require the expenditure of forty thousand dollars, it is safe to expect that the meaning of this word will be liberally construed. A public hearing on the matter should bring forth protests enough to insure the vetoing of the appropriation.

The New York Public Library

THE site of the magnificent library building for the city of New York, the exterior of which is now nearing completion, was formerly occupied by a distributing reservoir, whose gloomy but picturesque ivy-covered walls remained standing long after the reservoir had outgrown its usefulness as a conserver and distributer of water for the city's residents.

John Jacob Astor in 1849, James Lenox in 1870 and Samuel J. Tilden in 1887 each endowed separate libraries for the free use of the people of New York. In 1895 these three foundations, the Astor Library, the Lenox Library and the Tilden Trust, were consolidated to form the New York Public Library, the trustees of which now control not only these principal collections, but also the various branches of what was formerly the New York Free Circulating Library and the branch libraries which have been established under the terms of the gift of Mr. Andrew Carnegie, made in 1901. This consolidation was agreed to by the city authorities, with the provision that the building should be open to the public every evening, on Sunday afternoons and holidays, and that a circulating library should be maintained in connection with it.

THE CENTRAL FEATURE OF THE OLD RESERVOIR.

In 1897, the site having been secured and preliminaries arranged, it was decided to select architects by competition. Six designs were chosen from those submitted in an open competition and a second competition took place between the authors of these designs and six architects or architectural firms of eminence nominated by the trustees. The final result was the selection of Messrs. Carrère & Hastings as architects of the building.

The main front of the New York Public Library extends along the west side of Fifth Avenue from Fortieth to Forty-second Street; the tall windows of the great stack room at the rear looking out on the open space of Bryant Park. The location is in every way a suitable one; it gives the needed space for a monumental building, while it is easily accessible from the terminals of the New York Central and Pennsylvania lines, and up-and-down and cross-town local transportation lines pass nearby.

BIRD'S-EYE VIEW OF THE OLD RESERVOIR.

The length of the building, north and south, is 390 feet, with a boiler and engine room in the basement extending 51 feet beyond this on the Fortieth Street side; the depth, east and west, is 270 feet; the total cubic contents reaching 10,380,000 feet.

The foundation is built largely from stone selected from the walls of the old reservoir, already mentioned. Above ground the walls are of brick laid up in cement mortar and faced everywhere, including the interior courts, with white marble quarried at Dorset Valley and at Danby, Vt. This marble facing is not a thin veneer, but is bonded into the body of the walls and averages a foot in thickness. The floors are of steel beams with terra cotta arches; the roof of copper and glass. The interior walls of the rotunda, with the adjoining staircases and halls, of the exhibition room and of the stairs on the Forty-second Street side are of the same material, but the pieces are selected for veining and color. The main reading room will have walls of artificial Caen stone, with plaster cornices and book-cases of oak.

In general, the corridors will have marble floors and walls with plaster ceilings; offices and reading rooms will be wainscoted in oak, and will have plaster upper walls and ceilings and floors of red quarry tiles with marble borders.

The whole building is so nearly fireproof that no special vaults or chambers have been considered necessary for the keeping of rare and valuable books or manuscripts.

The heating will be by direct steam; the lighting by electricity, either taken from the street mains or produced by an independent plant on the premises. Up to the present, however, the lighting problem has not been exactly solved.

The scheme of exterior decoration provides places for six sculptured figures over the main entrance, but neither sculptors nor subjects have as yet been selected, nor have any arrangements or appropriations been made for the mural decoration of the interior.

In form the building is rectangular, with two interior courts. There are four floors besides the cellar. As will be seen on reference to the general views from the northeast, the sides and front of the building are comparatively low, the top floor being lighted by sky-lights. The center and rear part, forming a "T" and containing the main reading and catalogue rooms, rises much higher and is lighted by windows. The main book stack, aptly termed "the largest bookcase in the world," occupies the greater part of the rear. Attention is directed to the illustrations showing the progress of the building of this stack. The following data will enable one to attain an idea of its vast size. The space allotted to the stack is 297 feet long, 78 feet wide and has seven floors, each 7 feet 6 inches high. The construction is of small steel beams and angles, with floor slabs of marble one and a half inches thick. Each second or third floor corresponds in level with a floor of the building. There are sixty-five miles of shelves, with a capacity of 2,700,000 books. The capacity of the other stack room is about 800,000 books, making a total capacity of 3,500,000 books. The department of administration is on the Fortieth Street side, while the smaller reading rooms are mainly on the Forty-second Street and Fifth Avenue sides. From the main entrance the main stairway leads directly to the main

THE BASE OF THE BOOK-STACK.

reading room on the third floor, directly above the book stack. This room is probably the largest in any public library. It has a seating capacity for about 800 people, almost double the space

THE LOWEST TIER OF COLUMNS.

set apart for the public in the famous circular reading room in the British Museum built half a century ago.

This account would be incomplete without a brief reference to the rare possessions that will find lodgment in the building. The Lenox Library, celebrated for its collection of rare Americana, contains examples of every book obtainable printed prior to 1700, bearing on the New World. To these have been added George Bancroft's famous historical library and the Emmett papers relating to the Revolution. The files of newspapers form in themselves a rare collection and begin with the year 1710. While the earlier years are in some places fragmentary, yet there are no less than one thousand volumes of papers, published prior to 1800.

Besides these precious possessions, which deal with the history of America, the New York Public Library contains many rare books and folios, and many special collections, among which are some three thousand volumes of Shakspeariana; upwards of ten thousand volumes of music; eight thousand volumes of Bible collections, and a wonderful geographical collection of twenty-one thousand volumes, with many thousand maps from earliest times to the end of the seventeenth century.

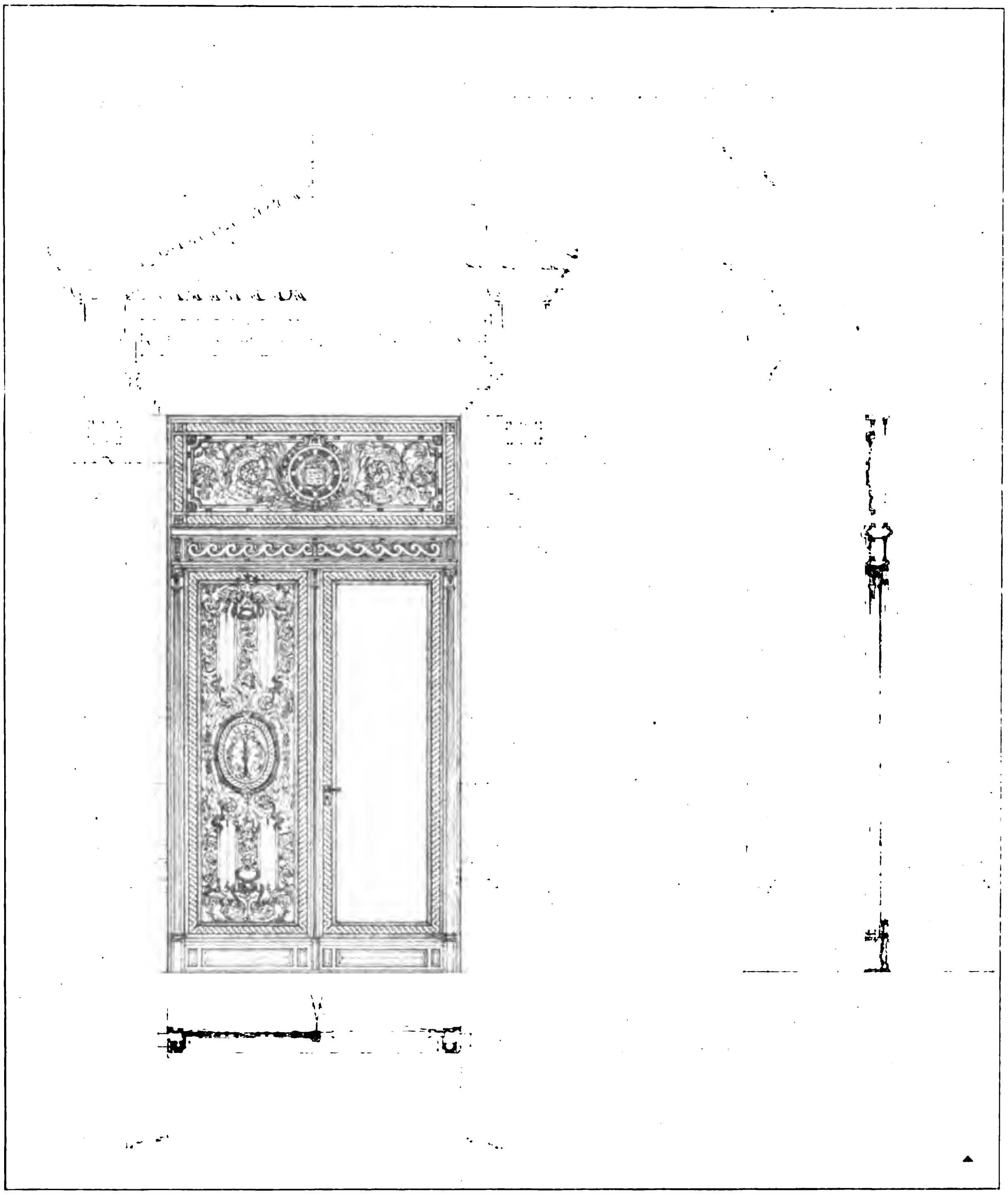
George Frederick Bodley, R.A.

EARLY on October 21 last, says *The Building News*, Mr. George Frederick Bodley, R.A., passed away, as it were, in his sleep, during an attack of heart-failure, at the advanced age of 80, but still in active practice, and full of honor. His work from start to finish was invariably as perfect as his loving care and consummate skill could insure. Everything he undertook was impressed by his refined and rare poetic fancy. His last drawing was made towards the end of last week, the subject being an altar-tomb, to be erected in the Benedictine Abbey Church of Downside in memory of his late partner, Thomas Garner, who died last year. Mr. Bodley's last letter was written to Mr. C. G. Hare, his present partner, on Sunday afternoon last, his note being full of humor. "The doctor says I need a 'rubber,' not of whist, but for indigestion." Fortunately, the geometrical drawings for the last great work designed by Mr. Bodley, viz., the new cathedral for San Francisco, are already completed, or almost entirely finished, so that it may be correctly said that the great master of church building died in full harness.

Born at Hull in 1827, he was the son of Dr. W. H. Bodley, of Brighton and Hull, a descendant of the Bodleys of Budleigh Salterton, Devon, and Sir Thomas Bodley, the famous founder of the Bodleian Library at Oxford, was his ancestor. He was educated at Dr. Morris' school, Brighton, and was a five years' pupil of Sir Gilbert Scott, with whom he resided. He married Minna Frances Henrietta, daughter of Thomas Reanely, of Kinnersley Castle, Hereford. The Royal Gold Medal of the Royal Institute of British Architects was presented to Mr. Bodley in 1899, and the Society of Arts awarded him their Silver Medal in 1903 for a paper on "Some of the Principles That May Be Guides for the Applied Arts." For many years his country residence was a genuine old Queen Anne house at Iver, where

he had a beautiful garden. Within the last year he left Iver and bought the Jacobean Manor House at Water Eaton, not far from Oxford, with its quadrangle in front, flanked by the old chapel on the right, and the barn buildings on the left, all built in stone. He was delighted with his new home, which, though unambitious and by no means large, is a genuine example of its date, 1586. It was erected by the Frères. Baron Lovelace lived in the house in 1644, and Lord Cleveland once made it a home. The A. A. was an expert, and in gathering together lovely samples of the applied art and curios.

Mr. Bodley's latest, and, perhaps, greatest undertaking was the Metropolitan Cathedral for Washington, the foundation-stone of which was laid by the Bishop of London only the other day. About six months ago he wrote us: "I have given up Iver and taken this most interesting place, dating from 1580. It is a very picturesque old house. I am much interested in the Cathedral at



ELEVATION OF DOORWAY BETWEEN THE SECOND FLOOR CENTRAL CORRIDOR AND THE STACK ROOM: NEW YORK PUBLIC LIBRARY.

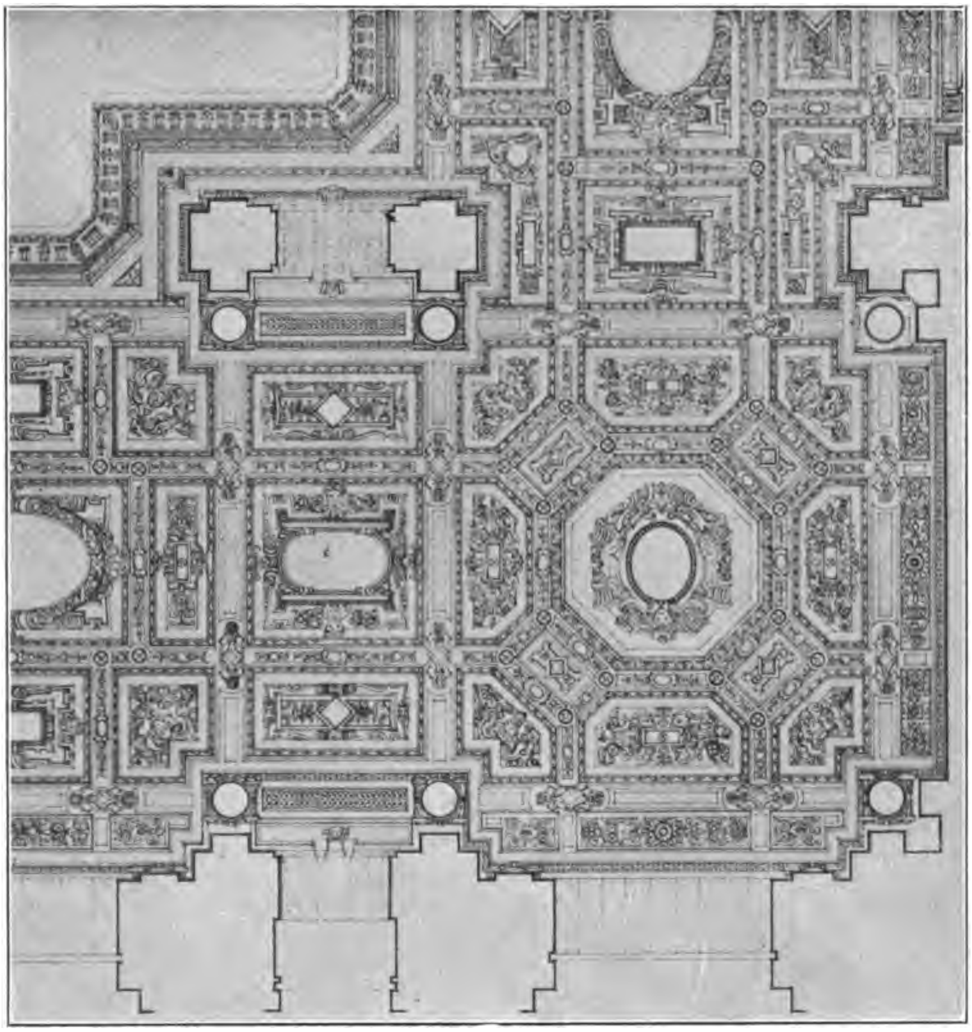
visited Water Eaton in 1890, when it was used as a farmhouse. It has now been made very beautiful, and the chapel is renovated and furnished with a rood-screen and fine altar piece. It was here that Mr. Bodley died. In 1892 he contributed an article to Mr. Norman Shaw's book, *"Architecture a Profession or an Art?"* his subject being "Architectural Study and the Examination Test." His more recent collection of poems exhibits his characteristic love of beautiful aspirations and elegant stateliness. Mr. Bodley's chief recreation was music, in which he

Washington, on which I am at work here with Mr. Vaughan, an old pupil of mine. It is a great opportunity. I am asked to design a cathedral, too, for San Francisco. I shall try to revive an interest in my beloved Gothic!" This will recall to many his remarks as the recipient of the Gold Medal eight years ago: "I think I owe this honor of receiving the Gold Medal more especially to my great love for that style of architecture which I have always held, and do hold, to be the most beautiful style—I mean the English Gothic of the Middle Ages. I believe that this

style is like Greek work in its refinement and great delicacy." There is one further quotation which will interest many, as it has reference to Mr. Bodley's association with the great cathedral at Liverpool, now in course of construction. It will be remembered that a series of two competitions took place, in which Mr. Norman Shaw and Mr. G. F. Bodley were the professional assessors, the matter being decided ultimately in favor of Mr. G. Gilbert Scott, and to enable the work to be proceeded with Mr. Bodley was made joint architect, in order that Mr. Scott, of the third generation, might have the advantage of his skill, artistic guidance, and practical experience, the designer himself being quite young, and necessarily inexperienced. Some critics, with more zeal than discretion, without knowing the facts so completely as they might, raised a discussion at the R. I. B. A. protesting against Mr. Bodley's dual position of assessor and then joint architect. On this subject, and on the occasion referred to, he wrote: "My accepting the post of joint architect with young Scott seemed, and, indeed, was, the only way out of the difficulty that arose. The idea was not in the least my own, but Norman Shaw's, and took me entirely by surprise when he suggested it at the committee meeting. . . . Meanwhile, I have the pleasure of working out details for once in a way—really thick walls and big piers."

His partnership with Mr. Thomas Garner, dating from 1869, was really a close collaboration at first; but as their practice increased it became more their habit to individualize and assume a separate responsibility for definite work. Soon after Mr. Bodley became a member of the Royal Academy, about 1882, he expressed himself to us very warmly at some of the firm's work being rejected from exhibition on the technical plea that the Hanging Committee must sit in judgment on Mr. Garner's share of the production, but were precluded from judging Mr. Bodley's part of the performance. This attitude has, we believe, been abandoned now, owing to a more recent Academician having threatened to resign if the point were insisted on. Mr. Bodley's election as a full member at the Academy in 1902, too long delayed, was not realized sooner no doubt owing to his unobtrusive nature and retiring disposition.

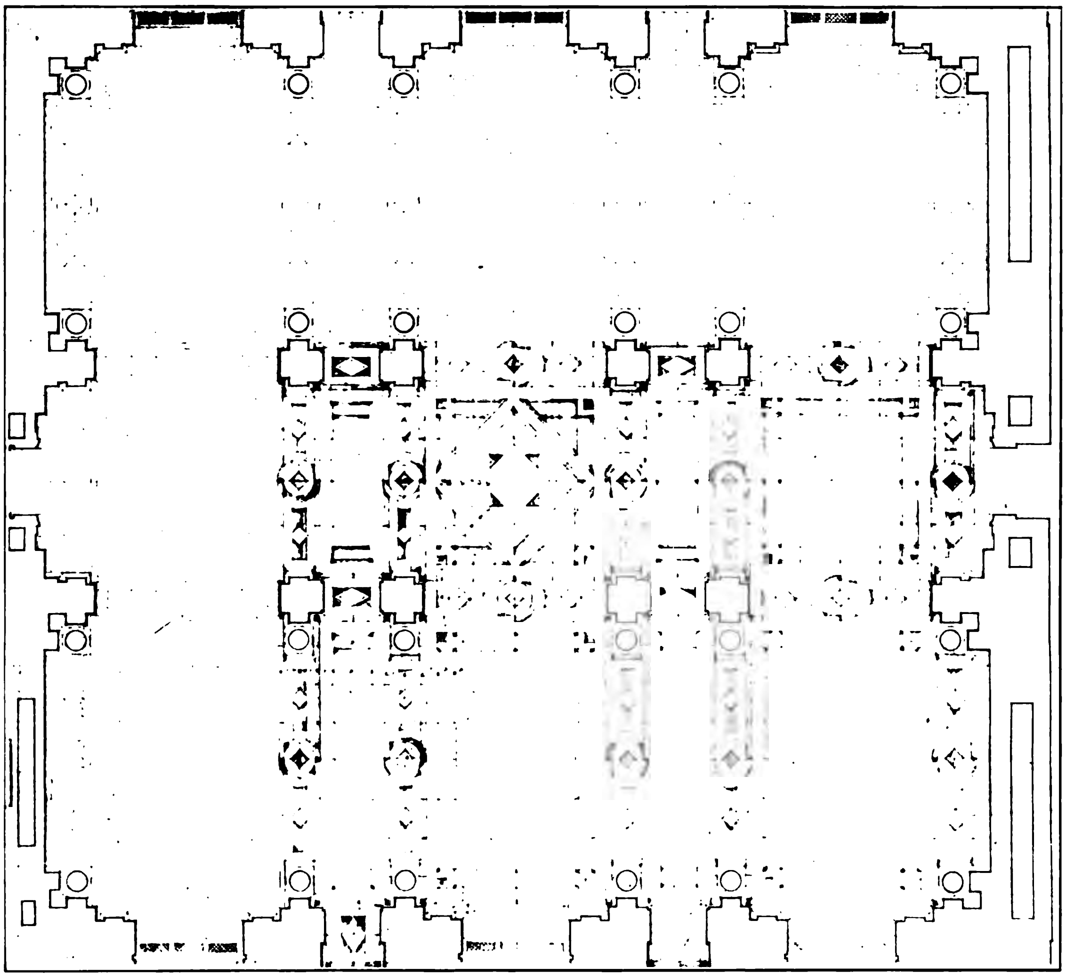
St. Michael's Church, Brighton, for the first vicar, Mr. Beanlands, was one of Mr. Bodley's earliest works after leaving Sir Gilbert Scott's office in Spring Gardens. It is conceived in the French Plate tracery mode; but this phase did not last long. St. Martin's, Scarborough, was another early church of his, with French feeling less pronounced, and the influence of Kirkham Priory in the neighborhood asserting itself. In the early sixties All Saints', Cambridge, showed no trace of this French fever. It was upon this work facing Jesus College that his partnership commenced. The Eton Mission, at Hackney Wick; St. Mary's, Clumber, for the Duke of Newcastle, near Worksop (Bodley Diploma work); and Eccleston Church, for the Duke of Westminster, near Eaton Hall, are here to be mentioned; also St. John's, Cowley, at Oxford, for the Cowley Fathers, for whom the community buildings adjoining were designed. Other works are Dane Hill Church, Sussex; Eckenswell Church; King's Stanley Church, Gloucestershire; St. Salvador, Dundee; St. Germain's, Cardiff; St. Adhelm, Branksome, Bournemouth; All Saints', Weston-super-Mare; Horbury Church, Warrington; St. John's, Tue Brook, Liverpool, 1868; churches at Epping, Skelmanthorpe, and at Norwood; transmutation of St. Giles's Church, Dorset, with new screen and altar, and a fine scheme of color decoration; also Christ Church, Ealing, W.; Bodley's Buildings, King's College, Cambridge; the chapel at Queens' College, Cambridge; and in the same university the new library at Christ Church, where Mr. Bodley decorated the hall; Holy Trinity, Kensington Gore; St. Matthew's Chapel, Allerton, Leeds; the new buildings in St. Swithin's quadrangle at Magdalen College, Oxford, and the tower of Christ Church, Oxford; also the President's Lodgings at Magdalen; the Master's House at University



THE CEILING OF THE EXHIBITION ROOM: NEW YORK PUBLIC LIBRARY BUILDING.

College, Oxford; the restoration of the west front of Peterborough Cathedral, which he partly rebuilt, with all the skill of a keen ecclesiologist and conservative repairer; the renovations of York Minster, and some work of the same nature later on at Southwark Cathedral; the tombs of Lord Salisbury, in Westminster Abbey, Archbishop Thomson at York, that of Bishop Woodford at Ely, and the memorial pulpit in the nave of Canterbury Cathedral, as well as Canon Carter's tomb at Clewer, where he built a church near Windsor. The new reredos and screen at St. Paul's Cathedral is a national work of far-reaching importance, and for richness and suitability makes a monument worthy of its prominence and scale. The hanging rood and triptych of St. Alban's, Holborn, for the Duke of Newcastle, is also a masterpiece of exquisite detail. The Worcestershire seat, for the Earl of Plymouth, then Lord Windsor, Hewell Grange, was done in partnership with Mr. Garner. Hayes Lodge, Morley, Derby, also, and Marlborough College Chapel; Hoar Cross Church, Staffordshire; and St. Augustine's, Pendlebury, Manchester, were more of Mr. Bodley's works. St. Michael's, Camden Town, is another, not to forget St. Michael's Church, Folkestone, with an extremely clever plan on an awkward site. St. Faith's, Brentford, is a similar work, just finished; but Burton Church, for Lord Burton, and the English Church at Florence, formed out of a big secular hall, though later, are much more important instances of Mr. Bodley's skill; while at Powis Castle, near Welshpool, including the decorative work he did there, is quite monumental in character, and was done for Earl Powis. The original offices of the London School Board, on the Embankment, was Mr. Bodley's work, and so was River House, Chelsea. The cathedrals at Hobart, in Tasmania, and additions to the cathedrals of Lahore and Nagpur show how far-reaching his reputation really was. His applied designs were manufactured for church furnishings in metal, in wall-papers, chintzes, and hangings by Watt & Co., of Baker street, in which firm Mr. Bodley was interested for more than a generation. The Society of Antiquaries have lost a famous member, and he will be missed at the Athenæum Club, and elsewhere, by all who knew him.

There is but one matter of regret associated with the end of so long and so noble a life, and that is that, full of years as he was, he had not lived to witness the completion of the two great works for which he was jointly responsible. Mr. Scott will miss him at Liverpool, and Mr. Vaughan at Washington. But Mr. Bodley, after all, only shared the fate of some of his great co-workers. We need only instance Herbert Gribble, the young architect of the Brompton Oratory; Street, the architect of the Law Courts; William Young, at the War Office; Bentley, the designer of the Roman Catholic Cathedral, Westminster; and Brydon, whose block of Government offices in Whitehall is now still but half built. No one of these architects lived to see the completion of his biggest design.



THE FLOOR OF THE EXHIBITION ROOM: NEW YORK PUBLIC LIBRARY BUILDING.

THE INFLUENCE OF STEEL ON MODERN ARCHITECTURAL DESIGN.[1]

ALTHOUGH structural steel is often clothed in the familiar architectural forms, it does not, except so far as already indicated, directly influence them because it is *steel;* but it does influence architectural form in the incidence of its enclosure. Steel, and the materials in which it must in ordinary cases be enclosed, are things so different that they cannot be built up together, and the old forms are less convenient clothing for them than thin slabs with their appropriately simpler architectural treatment. Steel will also influence architecture more indirectly through the changed proportions it effects. As the beam gives increased span and compels a trabeated form, and as the stanchion tends to increase the proportional height and diminish the absolute area of supports; and as the steel frame gives us buildings of a hitherto unparalleled height, borne on bases of a previously impossible area; it is through these strange proportions that it will further influence architecture, and not because it can embody a steel architecture or alter the many essentials which are the creation of other influences than those of materials.

A building may be framed in steel, but it presents to our eye

[1]Extract from an essay by Mr. Victor D. Horsburgh, A.R.I.B.A., to which was awarded the Silver Medal of the Royal Institute of British Architects.

the same brick or stone exterior and the same plaster, wood and marble interior as if it were constructed in the older manner. The influence of the texture and color of the brick and stone remains on the forms they are required to assume, although their structural influence may be undermined by steel. The close grain of the marble responds to delicate gradation of surface as before, and the influence of its figuring towards its exhibition in plane rather than heavily moulded or sculptured surfaces remains, perhaps augmented by the presence of steel. The influence of the surface and substance of plaster remains on the forms it embodies, although the changed method of its application to steel construction exerts a coincident and conflicting influence. The influence of our tile, slate or lead roof coverings remains little affected. We cannot build our walls, cover our roofs or line our interiors wholly in steel; steel is not sufficiently durable for convenient exposure, it conducts changes of temperature more than our ideas of comfort would endure. Our ordinary needs in the matter of ventilation are founded on the use of porous building materials, which, of course, steel is not; and if we attempted to live in a steel-clad house startling effects in these and other respects would ensue.

We may dismiss the idea of a metal architecture until we have a metal of the durability of copper, the strength of steel, and of the porosity and other passive virtues of stone, and nothing but an occasional building for some special purpose can be wholly constructed in iron and steel. Meanwhile the old and the new must march together. The old must lengthen its stride to its utmost, but to that utmost steel must confine its own gait.

Steel will exert a new or at least stimulate an old influence in the disruption of the structural material and the external form. When a building is constructed wholly in marble or wholly in stone, the columns, bases, capitals, cornices, archmoulds and other traditional forms retain their full significance, both structural and esthetic; and even when the interior of a wall is built in stone, and the external forms in marble, the structural incidence of these materials being identical, no new influence is thereby set to work. When, however, the heart of the wall is of brick, the small dimensions and rectangular form of the brick lend themselves to the building in of narrow bands, and to the facing of the wall with thin slabs of the finer materials, and so to an architecture of simple planes where the effect is sought in the general form of the masses and in the intrinsic beauties of the materials in a greater degree, and in moulded or sculptured forms in a less degree, as in Byzantine and some phases of Italian Art.

This influence is accentuated by steel construction, when it becomes impossible to build the clothing material in with the structural material, and its full force is probably not yet felt, but must doubtless in our interiors tend towards marble, veneer, mosaic and painted and plaster decoration.

The use of the complete steel frame is so far, and is likely to remain for the present, restricted to well-defined limits. The chief of these is the city site of high commercial value on which it is desired to build, for example, an hotel, or a large retail shop. In both instances steel can contribute economy in space and speed in construction, and if not fireproof it has at least the parallel quality of incombustibility. To the warehouse and factory class of buildings steel contributes not only the virtues just referred to, but the strength and elasticity demanded in buildings of many floors bearing heavy loads and moving machinery.

On the other hand steel construction is not likely to invade ecclesiastical architecture or, excepting very large town houses and flats, domestic architecture; nor is it likely to invade any class of rural architecture save barns and the like. In point of fact it is not used except where problems of economy of space, money, time, fire risk, or all four compel us to utilize its one good quality, namely strength, with its concomitants, including incombustiblity. In the vast majority of buildings these problems do no present themselves in a form acute enough to tempt us to use a material, or at least to adopt a complete construction in a material, so susceptible to corrosion and so unsuited to exposure as steel.

However restricted in sphere the influence of steel on our current architecture may be, steel must have a far-reaching and adverse influence on its permanence. If stone and brick piers are replaced by steel stanchions, and walls are built thinner in consequence, we cannot expect the buildings of our day to endure as the monuments of antiquity have endured. No doubt, with care and attention, the steel work in a modern building may last for a few centuries, but let us consider what will be the state of a great building framed in steel to-day when it is the age of, say, the Pantheon.

Western history gives no grounds for the supposition that one *régime* can last for such a period of time as the Pantheon has existed. The Pantheon is what may be termed a permanent building containing in its walls and roof nothing less enduring than concrete, masonry and brickwork, and these in great mass, and in consequence it has survived and can survive long periods of neglect and all manner of abuse short of demolition.

In the same manner such a building as an early French church, with its massive walls, stone domes and external stone roof, will survive the same vicissitudes of fortune. It seems irresistibly clear that a steel-framed building, or a building constructed largely of steel, will have ceased to exist long before it has reached the nineteen hundred odd years of the Pantheon.

Steel as we know it requires care for its preservation, and care it will not get for more than two or three centuries at a time. New developments or fireproofing science may preserve it from fire, but no human skill will preserve it from the neglect and violence of recurring revolutionary periods which no architectural monuments will endure, save such as are built in great masses of inert materials. Neglect and violence are things which steel will *not* endure, and when we consider its perishable nature and other unstable qualities all evidence seems to point to the life of structural steel, even with care, being limited to two or three centuries.

Supposing one age of architecture adopted a material so perishable that the lapse of a few centuries swept its examples off the face of the earth, it does not follow that the art and material presumed would cease to have any influence on architectural evolution. The influence of the architecture of one age on the architecture of the succeeding ages is twofold, the first being its contribution of form and method handed down by tradition, and the second, the direct example of its surviving monuments to the remoter ages. In the first aspect steel will be the means of contributing much to architectural tradition, but in the second aspect it will not be an influence at all.

It is hardly possible to appreciate the present influence of iron and steel without attempting to observe the trend of that influence, and consequently speculating on at least some aspects of its future extent.

It should not be presumed that a material with so many unstable qualities has come to stay for any considerable time as a structural building material. Steel at this moment, whether in the complete frame or the beam over the shop window, is an economic necessity, but the economic conditions which under our social conditions have created that necessity are not permanent, but are and have always been changing.

No conceivable change in social conditions could diminish the utility of the Forth Bridge or render its erection possible in any material other than a metal of great strength. Even if steam traction became obsolete, the new traction would still require the great steel- and glass-covered area of the railway station. No very great change in social conditions or public sentiment, however, is required to create a revolt against tall buildings, or to remove the necessity for more than four or five floors in all ordinary civil buildings, and with the higher floors would disappear, if not steel construction altogether, at least the heart of the problem of steel construction.

However that may be, the ingenuity and effort spent in attempting the solution of the problem cannot be spent in vain. Every honest effort, successful or unsuccessful, equips the author with knowledge and experience, and braces him for further and higher attempts. Present imperfection is a necessity to progress. The effort to overcome the æsthetic limitations and dynamic difficulties of the round arch so stimulated and quickened the wit of the race of Mediæval builders that the solution in the pointed arch covered our and other lands with architectural glories for four centuries. In the same way, the efforts of our generation to overcome the incompatibilities of steel cannot be in vain. The problem contains the very elements of architecture, and is therefore capable of leading to a forward movement in our art comparable in some degree with the active periods of architectural evolution.

In all probability the use of structural steel is a passing phase, a phase not to be measured by a few years but possibly by generations; but still a phase, and not a permanent institution, as the use of brick or stone. To bear a load sufficiently but not wastefully, to carry it to the earth directly, to balance a thrust exactly, to provide for every stress with skill, to place solid

over solid and void over void, and to plan and construct in simple and regular forms, are principles good for all, and common to all art and material. These principles steel requires and imposes in a degree so intensified as to make them almost peculiar to itself. They are the spirit of steel construction, and are as eternal as is Art. The body of steel may pass away, but the spirit will survive to quicken and rejuvenate; and who can say but that our twentieth-century architecture is in need of a purifying and co-ordinating influence?

Modern Steel Buildings

(*Continued from page* 149)

Let us now go back to our own building. The wrecking contractor has removed the old building. The foundation contractor has dug the caisson wells and has filled them with concrete. We now have our concrete columns on which to rest our steel columns, and we are ready to go ahead with the erection of the building.

Meanwhile the core of earth where the basements will be is still in place. We have saved a good deal of time by letting it stay there and by getting the caisson wells dug and filled first. If we had spent our time excavating we should not be able to begin on the steel work till late in the season, and then the cold weather would come on and the men would be subjected to hardships and the work would be delayed. Now, however, we shall be able to get all the outside work done during good weather, and by the time winter comes we shall have the shell of the building completed and we shall be able to turn some steam on while the plasterers and decorators are finishing the interior.

Meanwhile we can do our excavating at our leisure, and we can go as far down as we please and put in as many basements as we desire.

It is coming to be customary to go forty feet downward in Chicago and to have three or four basements.

Deep basements have become very desirable in Chicago ever since the freight tunnel was built. This tunnel is forty feet below the street level. It is about seven feet in diameter and fifty miles long. It runs underneath practically all the streets of the downtown district, and it extends south to about Archer Avenue, west to about Halsted Street and north to about Chicago Avenue. It is designed to carry coal and merchandise and mail and express matter and anything else that can be transported in a bore of this diameter. To a considerable extent it is intended to relieve the congestion of teams on the streets above.

In order to get down to the tunnel a building must have at least a third basement. Then it can receive its coal and get rid of its ashes, and do a lot of other work without cluttering up its sidewalks or its backdoors.

Altogether aside, however, from the advantages connected with a freight tunnel, it seems likely that the buildings of the future will have a great many basements. Land is so valuable in the heart of a great city that as we have been forced to go upward instead of spreading out, so we shall also be forced to go downward.

Using the methods we have already described, it would be perfectly feasible to construct a building with eight of its stories underground. Such a building could be lighted by means of an interior court, extending all the way from the top of the building to the bottom of the lowest underground story, if desired. From the engineering standpoint, there is practically no limit to the height or depth of a building. That is, of course, within reason. When you have caisson foundations, resting on bedrock, you have a basis on which you can construct twenty, thirty, fifty or sixty stories without danger. The real limit is the financial willingness of the owner to pay for the expense of carrying on building operations at so great a height, and the personal willingness of the tenant to put in his time traveling from the fiftieth story of one building to the fiftieth story of another. The speed of the elevator service here becomes an important consideration. Such matters, however, are not directly connected with the actual feasibility of erecting high structures. Such structures can be built. And they can also be extended as far downward into the earth as is financially desirable.

Already there have been successful experiments in this direction. The Criterion Theatre in London is an underground theatre. The floor of the Criterion restaurant forms its ceiling. The theatre is entirely underneath the restaurant, and the restaurant is at the street level. This is an extreme case. But it might frequently be desirable to build a theatre with its first balcony at the street level. One advantage of this plan would be that in case of fire the people in the second balcony would have a better chance to get out. They would be one story nearer the ground.

Let us now return once more to our new building. While the basements are being excavated, the steel contractor is getting his columns erected and is starting the building on its upward course.

Meanwhile the other contracts have most of them been awarded. The brick, granite, the terra cotta, the ornamental iron, the elevators, the boilers, the electric wiring, the rubber mats, everything goes under contract. In quarries and in foundries and in factories the materials that are to go into our buildings are being dug and shaped and burned and rolled and pressed and stamped and tested and prepared for shipment. In addition to the engineering plans we now have shop plans, which go to the places where the materials are being made ready Each piece of steel or iron or granite or terra cotta arrives clearly marked or numbered so that the workmen will know just where to put it. These workmen are employed by the contractors. The contractors have foremen who are in direct charge of the work. It is the business of the engineer-constructor to watch the contractors and their foremen and their workmen, and to see that they work harmoniously, and that they finish their part of the job on schedule time. The engineer-constructor tells them on what day they are each of them to begin, and on what day they are each of them to finish. He provides them with a schedule showing at just what stage of progress they ought to arrive on certain successive days. The engineer-constructor therefore has his representatives on the site of the building every day. He is responsible to the owner for the accomplishment of the work and the owner deals with the contractors through him.

In speaking of the engineer-constructor in this way, we are assuming that both the architect of the building and the consulting engineer are in the same business organization or that they work together as a unit. If, however, the consulting engineer and the architect come from separate offices, then both of them keep representatives on the job and frequently visit it in person. Whether they are personally associated in the same firm or not, they after all represent the same idea. That is, they furnish the technical skill and knowledge through which the owner works in paying his money to the contractors. The contractors do the work of erection and are paid fixed sums for their labor and material. The engineer-constructor is usually paid a certain percentage on the total cost of the work. There are other financial methods under which buildings are constructed, but this is a quite usual one.

As the steel columns are going up it should be noticed that each one of them consists of a large number of different pieces of steel, all soundly riveted together.

Piece by piece, then, the columns rise toward the required height of the building. As they go up, the contractor erects steel girders between them at the floor levels and then erects steel beams between the girders. The floors therefore will be supported by the beams and girders; the beams and girders will be supported by the steel columns; the steel columns will be supported by the concrete caisson columns; and the concrete caisson columns will be supported by bed-rock. A building of this kind, carefully erected, is about the safest kind of building ever devised.

Right next to the steel comes the terra cotta or concrete fireproofing. Each column in a fireproof steel building is encased in terra cotta from top to bottom. This is called fireproofing the steel. Terra cotta is a clay product that has been burned with exceptional thoroughness. It has come to have a large place in building operations. And it is used not only to encase the steel frame of the building, but also to form the arches of the floors and in a more refined state to cover and ornament the street elevations of the building. As the terra cotta, piece by piece, begins to creep over the steel, the brick contractor and the stone contractor begin to follow.

The brick and stone for the walls of the building rest usually on the outside beams and girders, called lintels, of each story. That is, the masonry of *each* story is really a structure by itself. That is why it is possible to do the masonry work on an upper story before the masonry work of a lower story has been started. Brick, stone and terra cotta may all be used in the walls of modern steel buildings. But they are only a shell. The kernel is the steel frame.

While the steel columns are being fireproofed with terra cotta,

and while the walls are being built, the floor arches begin to appear. These arches are built on the ordinary arch principle, with keystones and subordinate pieces. They are sprung between the beams and girders at each floor level. They support the weight of the flooring itself.

This flooring, on which people will stand, may be made of wood or stone or marble or concrete, or any other suitable material. But it is not the real floor. It is just a coating. The real floor consists of the floor arches. The floor arches sustain the weight of the flooring and of the things and people on the flooring.

When the steel frame has been erected and fireproofed, when the walls have been built, when the floor arches have been sprung, it is clear that the big outlines of the building have been completed. But meanwhile everything else has begun. The staircases are going in. The elevators are being installed. The boilers are being moved into the basement. The woodwork of the doors and windows is being erected. Glass is being moved into place. All these things keep happening at the same time, and unless they are managed harmoniously the building will be delayed.

When the last tap of work has been done and when the building is ready to be handed over to the owner for occupancy, we can stand off and take a look at it. Six months, or twelve months, or eighteen months, depending upon the size of the building, have passed since the wreckers were let loose on the old structure. Since that time the engineer in charge may have spent five million dollars on behalf of the owner. Of such a sum about $600,000 may have been spent on steel and about half a million each on brick and stone. In the new County Buildings, Chicago, there are 35,000 different pieces of steel besides 500,000 rivets. The steel pieces in that building, set end to end, would reach 250 miles. If the same weight which exists in these steel pieces were put into an iron bar a quarter of an inch in diameter, it would reach all the way around the world, with a thousand miles to spare. The granite in the County Buildings weighed more than 11,000 tons. Five hundred cars were needed to haul it from the quarries. The scope of such a structure, and its wealth of detail, are overpowering.

But let us take a look at its strictly architectural features.

Most modern steel buildings are erected for purely commercial purposes. The owner has land of a certain value. He puts up a building of a certain value. And he naturally wants to get the largest possible return on his investment. The architectural features of the building are therefore the features in which he economizes, except insofar as the public comes to demand a handsome building for business purposes. In some cases a big firm will erect a handsome building simply as an advertisement. In such cases the architect is freer to devote himself to the development of a beautiful structure. But the usual rule is that the building is strictly commercial, and that the owner is satisfied with such architectural beauty as will be sufficient to attract tenants. And perhaps it is more fortunate in some respects for the architect when the owner looks at the proposition in that way. For when the architect is given a free hand his troubles begin. The modern steel building is more difficult to harmonize with the traditional rules of architecture than any other kind of building that was ever invented.

One of these traditional rules is, for instance, that the building shall look to be what it really is, that it shall not be a sham, that it shall be sincere. Now a modern steel building has a steel frame. Yet, on the outside, it looks as if it were made of stone and brick and terra cotta. This is clearly inconsistent. And it is an inconsistency that runs all the way through the building.

In many a steel building, for example, you will find beams that are carried across the ceiling in certain big rooms and that look as if they were supporting the ceiling. Yet, if you are familiar with construction, you know that they are not supporting the ceiling at all.

These beams are simply made out of plaster and other similar materials. They support nothing. They are themselves supported by the floor arches and the beams and girders. They are not architectural construction. They are simply architectural decoration.

These grand columns that we see so often on the exteriors of buildings might theoretically be supposed to consist of big, single pieces of stone or marble, worked into the proper shape. As a matter of fact, they are in all probability nothing of the kind.

If they resemble a great many of the columns that have been erected in modern times they are built out of a series of separate pieces about five feet in height, these pieces being placed one on top of the other. It frequently happens that the eye is even more grossly deceived. Each piece of the column (technically called a drum) may consist of several smaller pieces tied together with pieces of metal called dowels. The column may be hollow in such cases or may have concrete work and masonry inside it. It may also be anchored by other pieces of metal to a steel column. The architectural column then consists of metal, of concrete, of masonry, of hollow spaces, and of pieces of stone joined together to form drums which then, arranged in a vertical series, produce a column-like effect.

Such a column is extremely painful to some people. But this is merely incidental. The fundamental difficulty is to make a steel building look sincere, that is, to make it look like a steel building.

Now the central fact in a steel building is the steel column. Yet how can the fact of the existence of steel columns be even indicated to the occupant of the building? In the first place, it has to be concealed with terra cotta in order to render it fireproof. In the second place, it has to be still further concealed in order to make it attractive to the average eye. The steel column, by itself, is a comparatively narrow and superlatively angular and ugly thing. People demand that it be padded out and made to look symmetrical before it is allowed to appear in the walls of the finished rooms. If the steel column were exhibited to the tenant in its original shape it would look sincere, but its sincerity, like that of many human beings, would not bring it many friends.

The difficulty we have with the column is the difficulty that exists for the whole building. The frame of the building must be of steel. Yet it is very puzzling to discover any way of finishing the rest of the building with any reference to that fact. As things stand to-day, the modern office building continues to look as if it depended on masonry while in reality it depends on metal.

ILLUSTRATIONS

THE NEW YORK PUBLIC LIBRARY BUILDING. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS.

A description of this building will be found beginning on page 163 of the current issue. This, with the ten full pages of plates and ten text cuts which accompany it, will inform our readers of the present condition of the structure and even enable them to have some conception of what its final appearance will be.

NOTES AND CLIPPINGS

A Power House Under a River.—About twelve miles from the city of Baltimore, on the Patopsco River, there is now nearing completion what is probably the most extraordinary power plant in the United States, if not in the world. Briefly speaking, the dam and power house are one; in other words, the dam is made hollow and the interior, which is about two hundred feet long and twenty-eight feet wide, is utilized for the generating machinery. At the present time the equipment of the plant consists of two alternators, direct connected to two 500-horsepower horizontal turbines. This will be shortly enlarged by the addition of another turbine and alternator of equal power, bringing the total horsepower of the plant up to 1,500. The interior of the power house, which is constructed entirely of concrete and steel, is remarkably well lighted and ventilated. This is accomplished by the novel construction of the dam, which is formed somewhat in the shape of the letter "S"; the upper portion of the dam slopes at an angle of 45 degrees; this, in connection with the lower slope, throws the excess water flowing over the dam away from the outer wall. This wall is pierced through with many windows, giving splendid illumination to the interior of the power house. These windows can be opened, and one may look out and see the water pouring in torrents over his head. Ventilation is easily secured by two hooded entrances, one on each side of the river, by means of which one may enter on the Baltimore County side, pass through the power house under the dam, and emerge on the Howard County side; the river at this point being about two hundred feet wide. It is one more triumph for modern skill and genius.—*Arthur H. Goldsborough in the Technical World Magazine.*

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ILLUSTRATIONS:
The New Movement in American Architecture as Exemplified at the Exhibition of the Pittsburgh Architectural Club: Three Plates.—Three Country Houses: One Plate.

ALTHOUGH architects are, or should be, before all things artists, many a body of scientists or men of affairs might profitably take example from the businesslike way in which the recent meeting of the American Institute of Architects was conducted under the able chairmanship of President Day.

The reports of the proceedings and discussions at the recent Chicago convention cover some two hundred and fifty typewritten sheets, and the committee reports and the contributed papers nearly as many more. No irrelevant or impertinent matters were taken up and the work which all this records was accomplished in half-a-dozen business sessions on three consecutive days.

THE vague and nebulous yearnings for an "endowment fund" that some members of the American Institute of Architects have felt for some time should be pretty effectually extinguished by the report on that matter presented at Chicago. Not only is it pointed out that the present time is unfavorable for making any attempt to procure lay subscriptions to such a fund, but it is sharply declared that no "appeal for an endowment with any selfish or personal end in view" can be thought of; that the "comfort and luxury of the headquarters in Washington" is not a matter of public concern, and, finally, that there is no real need for such a fund, as the Institute has in being or in contemplation no undertakings that properly invite the fostering of a generous public. The report closes by pointing out that, before attempting to raise an endowment fund, it must be determined how such a fund should be used when raised and that a programme should be formulated in advance that will present "a serious, intelligent and organized project for future action." Of the five possible uses mentioned in the report to which the Institute might be expected to apply the income of the desired fund, three seem to us to come clearly under the head of "selfish or personal ends," while the other two are almost as clearly not crying needs.

THE National Fire Protection Association seems a little inclined to attempt to persuade the Board of Underwriters to modify some of the stringent provisions of its "Building Code" which, as we pointed out the other day, have a tendency to delay the very reforms it is desirable to promote. Of these two powerful organizations the first-named is, in the nature of things, likely to be best advised, since its membership, while harmonious in seeking the best available routes over which to reach the desired goal, is very complex and so questions are debated from many points of view. The Underwriters unfortunately have but a single object, the preservation of their own profits, and unfortunately, too, they are in a position to exact compliance with their demands, or, if these can be evaded the profits to the evader are so great as to be irresistibly tempting to a certain class of men, and in this way evil conditions are created that might be escaped under less stringent yet as satisfactorily protecting regulations. It means a good deal, when so sincere and fair-minded a person as Mr. Alfred Stone, the Institute's delegate to the National Fire Protection Association, asks in his report made at the recent convention in Chicago: "Is it not, therefore, better to make our building codes such as will afford that protection against fire which will induce and encourage owners to erect such buildings, rather than to make the requirements so severe as to be practically prohibitive to the majority of owners?"

CAMBRIDGE, MASS., a city that, though seated on the left bank of the Charles River as Boston is seated on the right, will inevitably form some day a large and important fraction of "Greater Boston," is just now revising its building law. Amongst other things, it seems likely to adopt regulations for the building of tenement-houses that are far less rigorous than the provisions that control the erection of such structures in Boston, because it is felt to be certain that such a stringent law would absolutely put a stop to the erection of buildings of low rental, such as the people must have. The contention is good and can be supported by more than merely plausible arguments, and though the situation, not only in Cambridge but elsewhere, is unfortunate, it is nevertheless certain that all growing communities must go through a chrysalid stage of existence on their peripheries in passing from country to urban, via suburban, habits and conditions. It seems to us that this necessary

condition might be recognized by the law and that it might be assumed that at certain stages of development property-owners were not trying to dodge their full responsibility to their fellow-citizens, but that in seeking permission to erect combustible buildings they were actually merely trying to erect "tax-payers," so that they might hold on to their land and eventually enjoy the benefit of the unearned increment through advancing real-estate values, a right which is naturally and properly theirs. The difficulty and injustice inherent in the situation might be minimized, with no great risk to the public, by issuing to such owners permits to build combustible buildings and maintain them for a limited term—ten, fifteen or twenty years—on the condition that at or before the expiration of the term the structure should be removed at the owner's cost and replaced only by incombustible buildings, and that during the entire term the combustible building should be kept in good repair. In many cases this conditional permit, which obviously has points in common with the English system of building on leased land, would give genuine relief to the prospective improver. In more cases, particularly where speculating operators are concerned, it would be likely to tend to induce them to decide to erect non-combustible buildings, for it would be easy to see that, while the cost of maintenance must endure for the full term, rentals could hardly help declining as the life of the combustible building drew near its close. This and the cost of removing the building would probably induce speculating builders to erect non-combustible buildings in the first place.

ACCORDING to the fire-insurance tabulations, the cause of more fires and greater consequent loss in this country during the last twenty-one years than were started by any other agency is the "defective flue." To this avoidable blunder are charged a total of 20,052 recorded fires and a loss of $93,662,920 in the period named. In this connection it is worth while to draw attention to the French method of dealing with responsibility for such disasters. Recently a citizen whose property was destroyed because of a defective flue—they have them even in France—sought indemnity, after the usual French fashion, at the hands of the contractor, but the court held that the builder could not be held accountable, as "his own modest rôle consisted only in carrying out the orders of the architect." This seems to be a reversion to an old order of things, for since 1881 the Conseil d'État has been disposed to hold that architect and contractor are equally responsible for *vices du plan.* At the same time it recognizes that the circumstances of each case must be carefully considered, but it is satisfied that a contractor can have no excuse for faithfully following an architect's drawing and instructions when these contain errors that should be obvious to the builder having merely elementary knowledge of his calling. As to defective flues in this country, one of them was detected and future disaster prevented the other day in a rather ingenious manner. In a country town where the little building that goes on is of a good type the building inspector found reason to suspect that a chimney had not been built according to specification, so he rigged up a combination of mirrors and at length discovered that, though the flue had been built properly at the start and where the chimney topped out, the fire-clay flue-lining had been omitted between these points.

THE "crazy-quilt" that was the aspiration of many vacant minded American women some years ago is brought to mind by the resolution that was adopted at the recent Peace Conference at The Hague. At the suggestion of Baron d'Estourneles it was gravely resolved that: "This Conference expresses an earnest desire that each Government signatory to The Hague Convention will contribute to the embellishment of the Palace of Peace by sending, by arrangement with the architect, materials for its construction and decoration, and objects of adornment, which shall be the most perfect specimens of national production, so that this Palace, the expression of a universal hope and aspiration, may be made of the very substance of each country." If this is not merely a very clever device for enabling Mr. Carnegie's too-modest gift to cover the cost of M. Cordonnier's too-elaborate design, it deserves to be considered a real modern apple of discord. Imagine the Gallic ire if France, after deliberately striving to outdo Germany, should find that the architect, advised by the trustees, had decided to give Germany's offering the more conspicuous place, and then there are Japanese and Russian susceptibilities that easily may be ruffled, to say nothing of South and North American. Except for the range and variety of possible offerings, there is nothing absolutely novel in the suggestion: but where it has been tried before this the result has been far from satisfactory. The blocks contributed by the several States and built into the Washington Monument add little to the interest and nothing to the dignity of that structure, and—a closer parallel—the Hall of Statuary in the Capitol is with the addition of each new statue losing dignity and congruity.

WE have received from a Dutch architect the illustration of M. Cordonnier's amended design for the Peace Palace which may be found in another column, our correspondent asserting that many of the Dutch architects would be interested in knowing what we thought about it. Although the sketch is crude and perhaps prepared by some one hostile to the winner of the competition, it is evidently reliable enough to show that M. Cordonnier has not been happy in his attempt to fit his design to his appropriation, and that if Mr. Carnegie has any regard for his own reputation he will at once increase his gift so that Mr. Cordonnier may revert to his original design, which had the merit of being at least coherent. As the final design is here shown no one, we think, would imagine it to be the work of a French architect; it is far more like any one of a hundred competitive designs for an English town-hall such as could be found in quantities in the English architectural journals a score of years since.

A Great Exhibition

WE have seen the announcement in the papers of an architectural exhibition at Pittsburgh; we may have heard someone speak about it; we have, perhaps, been fortunate enough to see the catalogue, quite exceptional in its happy choice of material never illustrated in previous catalogues, a selection made all the more remarkable by its success in the elimination of dead wood. We may have had the opportunity of talking with some one who had just seen the exhibition, who, fired with enthusiasm, had given us a glowing account of its marvels. Of the latter we would probably say: "Oh, he has had a pleasant trip, met pleasant friends, had good things to eat. So this unwonted zeal for the exhibition is only a vent for his general exuberance." But let us go to Pittsburgh ourselves. We arrive in the cold, damp chill of the early morning. A heavy, black fog shuts us in on every hand. Faces are ashen; everything we touch is black and grimy. We jump into the first car for the Carnegie Institute. We pass block after block of dismal houses, all the more wretched for their shroud of black. We bury ourselves in a local paper, only to be mocked by flagrant headlines on the glories of Greater Pittsburgh. We must note in passing, in her defense, that just at present the Pittsburghers are keenly alive to her defects, and strenuous efforts are being made to completely overhaul and remodel the city. In fact, only last evening I attended a most enthusiastic mass-meeting in Carnegie Hall, where President MacClure, of the local Chapter of the A. I. A., showed many interesting views to this end, together with several most ingenious and interesting schemes for solving Pittsburgh's own peculiar problems. Soon, however, we come out into more open country, to descend, opposite Schenley Park, in front of the Cargenie Institute. We mount to the top floor, to find ourselves in a great central hall, from which galleries radiate in every direction; in one direction, in particular, a long vista of galleries seems to stretch out interminably, through which we catch glimpses of *stili* other galleries opening beyond on either side. And everywhere the walls are covered; covered with drawings large and small, pencil, pen, water-color, pastel, charcoal, from the sketchiest pencil note to the most elaborate rendering; American, English, French, German, Austrian, Italian; of subjects from a wall-bracket to the great city plans; a staggering agglomeration, bewildering in its variety, astonishing in its completeness. Rooms vast and brilliantly-lighted contrast with smaller, cosier ones, equally well lighted, yet the largest rooms are far from barn-like, broken up as they are by many potted plants and trees sheltering happy bits of sculpture and numerous charming plaster models. How much these latter are enhanced by their surroundings! Well placed benches and comfortable arm-chairs all tend to make us realize the finishedness of the exhibit. Further, what is true of so few exhibitions, everything is well hung. Practically no one can complain of poor light or of being badly placed, for there are no bad places. The exhibits closely cover the walls, yet without being crowded. There is not the slightest sense of stretching things out to make the exhibition appear large. And then, all of a sudden, it comes over us how large the exhibition really is; enormous, in fact. At first it sounds like an exaggeration, yet it is a fact that this exhibition is nearly twice as large as any architectural exhibition ever held in America. The T-Square Club, of Philadelphia, had 559 exhibits at their last exhibition; the Architectural League, of New York, had 752 exhibits. Yet here in Pittsburgh there are actually displayed 1,508 objects of interest! And when I say objects of interest, I say so advisedly, for no one who gives even a hasty glance about these walls can say that quality has been sacrificed to quantity. Far from it. In fact, especial credit is due the committee for the judgment and tact they have shown in the elimination of that dead wood which covers the valuable wall space of so many exhibitions.

As we have wandered about the galleries, one thing has particularly struck our attention, a thing we have previously so often missed, yet a thing which adds immeasurably to the pleasure and profit of an exhibition. The drawings are grouped; grouped rigorously according to subjects; grouped intelligently so as to allow of easy comparison of similar subjects or of subjects rendered in similar mediums. All drawings of interest toward civic improvement, from drinking fountains to great city plans, are in one section; all school drawings and *projets* are by themselves; all foreign exhibits—and here the committee have been to a great deal of expense and trouble to make as complete a representation from France, England and Germany as money and hard work could secure—occupy another vast gallery; all water-colors and pencil sketches are in rooms apart; churches take another large gallery; miscellaneous, unclassifiable material fills several other rooms, while one room and part of another are given to a most interesting and original feature of the exhibition, to wit, what is known as the "Modern Movement," in all a most comprehensive and intelligent arrangement.

And now we begin to realize what this all means; we realize that the enthusiasm of our friend returning from here was not vain. We realize that the discomforts of the journey, the cold reception in the morning, and the depressing effect of crossing the city, were all well worth the trouble, for we are actually at one of the most profitable, if not the most profitable, opportunity for architectural analysis and comparison that America has ever afforded. A standard of excellence has been set. A gauntlet has been thrown down. Who will take it up?

I asked Mr. Richard Kiehnel, the chairman of the Exhibition Committee, if I should see him at the galleries on Sunday afternoon. "See me at the galleries," he said. "When do you think I am going to catch up on my own work? Do you realize that I have hardly been able to go near my office for the last two months?" And what is true of Mr. Kiehnel is practically as true of the secretary, Mr. Stanley L. Roush; the treasurer, Mr. James Macqueen, and Mr. John T. Comes, Mr. Benno Janssen and Mr. Edward B. Lee. Further gratitude is to be extended to the Committee on Arrangements and Hanging, composed of F. A. Russell, chairman, and A. B. Orth, E. Campbell, A. Zeller, C. A. MacClure, J. P. Alaux, and H. K. McGoodwin, also to M. A. Vinson, the advertising representative. They certainly deserve, one and all, the utmost credit.

Now that we have had a general look about the exhibition, let us take each of the rooms in turn and study them in detail, following the same order that I sketched above. Thus we will commence with the room devoted to civic improvement.

CIVIC IMPROVEMENT.

What an immense amount of agitation there has been in America within the last few years along the line of making our cities and towns, not only more livable, but more beautiful! One has only to see the quite incomplete, but yet large, exhibit of this subject here at Pittsburgh to begin to realize the extent of the movement. Burnham's San Francisco plans and sketches—twenty of them; the commission's five big perspectives of the Washington layout; the Cleveland plan, which gives a good standard of comparison for the new scheme of the Pittsburgh Chapter of the A. I. A. for the civic improvement of Pittsburgh. Five large plans and a perspective show most interesting solutions of a civic center opposite the Court-House, with a large, much-needed city hall crowning the hill. Other plans show a comprehensive scheme for laying out the Oakland district between Schenley Park and the Carnegie Technical Schools. Other drawings show Zantzinger, Borie & Cret's scheme for improving the Schuylkill at Philadelphia, Burnham's plans for the layout of Manila and Baguio, Reed & Stem's plan for Croton, N. Y., Mac-

Clure & Spahr's plan for the Pittsburgh Reduction Company's model village, and Alaux's design for an open-air theatre at Pittsburgh; in all one of the most interesting parts of the exhibition.

SCHOOL WORK.

The rooms devoted to school work are interesting from the number of schools and clubs represented. The T-Square Atelier is represented by ten good exhibits, among which a XVIth century ship, by J. Forsythe, attracts by its imaginativeness, and a fraternity room, by C. Schaeff, is marked by a pleasing handling of color. T. H. Ellett shows a serious study for an art club, while his perspective and that of C. E. Cope, for a church, are interesting in color contrasts.

The University of Pennsylvania shows nine good drawings. P. Monoghan's chapel is simple and broad in handling. W. Boyd's recreation park is free as to scheme and well presented. The same is true of R. McGoodwin's monument. F. P. Smith's memorial hall is well studied.

The George Washington University exhibits some six or seven good designs.

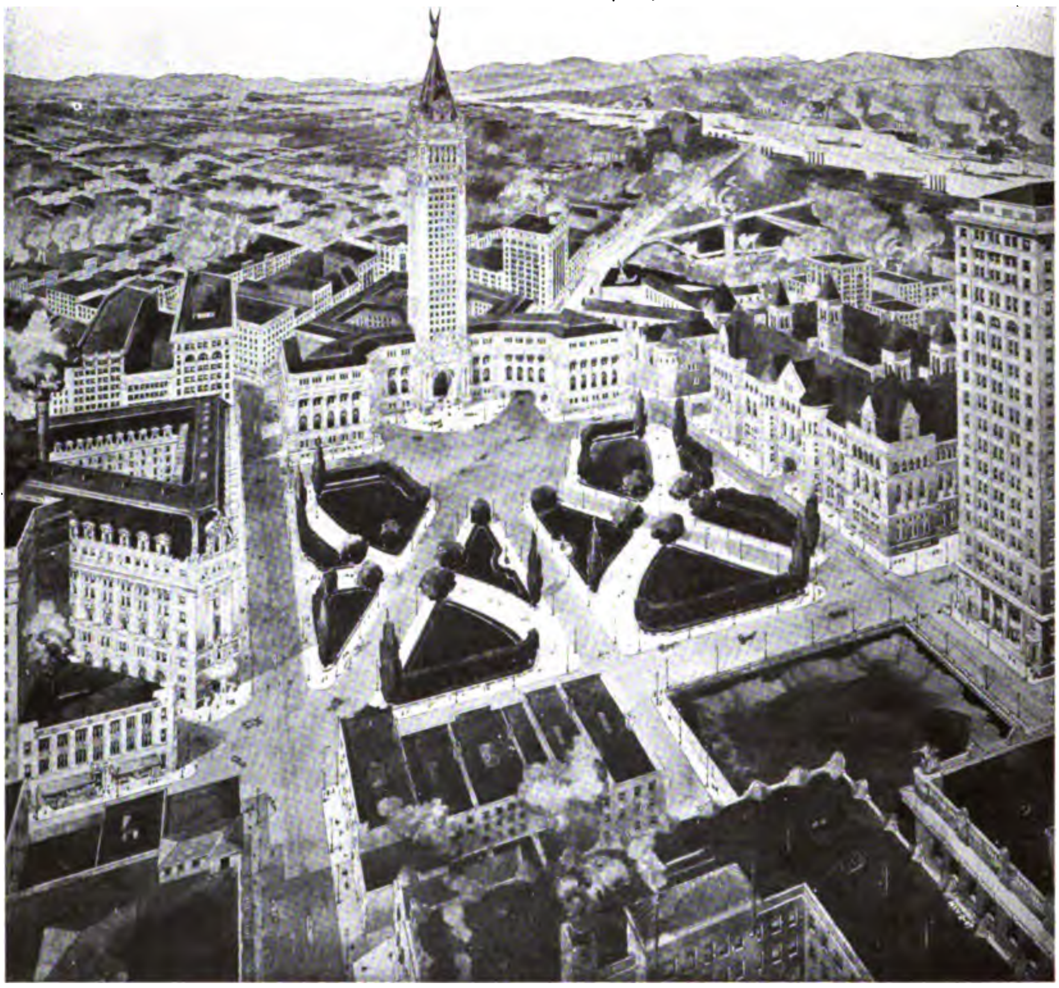
The Massachusetts Institute of Technology has twenty-six exhibits, dating back over the last nine years. More recent are two beautifully presented details of art museums, by O. A. Faelton and A. J. Scholtes. A sketch reception room, by the former, is very free in treatment. M. H. Whitehouse's 1906 prize design for the travelling scholarship, and E. S. Campbell's 1907 prize design are interesting. Simpson's chapel interior is delicately handled. A town plan, by Miss I. A. Ryan, is well studied.

Columbia is represented by twenty-five exhibits centering about W. L. Bottomley's prize design for the McKim Fellowship. R. H. Bullard's naval memorial is strong in design, as is also H. F. Hentz's band stand. C. H. Kysor's band stand is charming in presentation. The same is true of W. F. Lamb's casino. E. T. Sec's church and E. J. Stork's concert hall show much careful study.

Washington University, St. Louis, has three drawings, of which E. T. Sec's church and E. J. Stork's concert hall show much

The Washington Architectural Club is represented by twenty-one designs. F. V. Murphy's club scholarship drawings and envois make a good showing. Among the Society of Beaux Arts Architects' problems, a music room, by D. C. Bollard, is interesting for its strength and good study.

Cornell has fourteen exhibits, among which T. H. Graham's and F. P. Nichols' Galerie de Fêtes stands out by its charming



SUGGESTION FOR THE IMPROVEMENT OF THE CITY OF PITTSBURGH.

presentation. A church by C. C. Chadwick and a world's fair pavilion, by J. M. Kellogg, should be noted.

The new Department of Architecture of the Carnegie Technical Schools, at Pittsburgh, has ten drawings. The exhibit is particularly creditable in light of the short time the school has been running. S. L. Roush's arts and crafts' workshop and museum has much charm of design. H. E. Mackley's bishops' tomb is beautifully drawn and presented. A. J. Reber's entrance to a park should be noted.

The Pittsburgh Architectural Club shows the prize drawings for the last two years for their scholarship, the $300 to be used in measuring up good old work in America. Mr. King's prize drawings were full of taste.

HOUSE OVERBURY, WORCESTER, ENG. ERNEST NEWTON, ARCHITECT.

Paris is represented by two *projets* by E. J. Weber and *esquisses* by Licht and Ford.

The great attraction of the exhibition in the way of school work is Wagner's prize drawings for the Paris prize competition. They are probably about the most interesting school drawings ever made in America, and, further, they compare very favorably with the better work of the École des Beaux Arts in Paris.

FOREIGN EXHIBIT.

The French exhibit covers nearly two whole walls of a vast gallery. On approaching it, our attention is immediately drawn to a number of elevations and perspectives exquisitely presented in monotone wash. The designs are quite decidedly what is known as "French." They are the work of M. Godefroy, of Paris. Two perspectives in particular, one a vestibule and stair hall interior, and the other a colonnaded exterior at Limoges, are most interesting in presentation. Two interiors, one of a Salle de Fêtes and the other of a Salle de Conseil, show quite another treatment in very soft, warm, golden browns, charming in texture and play of color. M. Alaux, who is now Associate Professor of Architecture at the Technical Schools in Pittsburgh, exhibits a number of sketches and measured drawings in color, chiefly from Spain. His measured work in the Alcazar, and especially two perspectives of fountain courts there, are characterized by a delightfully free and painteresque handling of color. A. Fivaz shows some brilliant Venetian water colors and plans and elevations of a big railway station at Basle, Switzerland. M. Maignot exhibits a number of drawings of a large French wine-making establishment, and in conjunction with M. Tortrat he exhibits plans, elevations and sections of an extensive abattoir-market for the city of Rheims, France. This latter is quite logical and straightforward, both as to plan and elevation. It shows an interesting and sane tendency to an individual modern treatment.

LODGE OVERBURY, WORCESTER, ENG. ERNEST NEWTON, ARCHITECT.

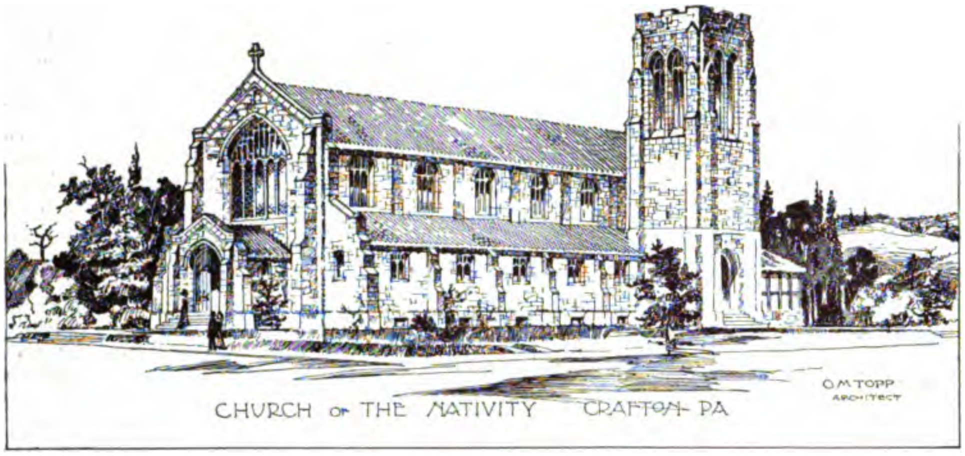
The English exhibit represents the work of some ten architects, among whom Ernest Newton especially interests us with his charming country houses in water color, or pen and ink, as does also C. R. Ashbee along somewhat similar lines. A. N. Prentice shows work of like character, while Ricardo has an interesting treatment all in green and white, ceramic and semi-glazed tile. He also shows a quite original railway station at Hourah, Calcutta. Lanchester & Rickards exhibit the Deptford town hall, E. W. Mountford the new Central Criminal Courts and the new Sessions Buildings in London. Mallows shows civic buildings in Birmingham and Westminster, and Sir Aston Webb drawings for the new Victoria and Albert Museum. We miss those charming modern English home interiors, otherwise this exhibit is characteristic of the modern English work.

Germany sends some eighty-five exhibits, chiefly photographs of executed work, but also many water-color drawings. They represent the work of some twenty-eight architects. This is much the most interesting of the foreign exhibits, for it has something to say, and says it. It illustrates the modern German movement to solve present-day problems in a simple and logical manner, entirely untrammeled by precedent or conventions. As this can be more profitably treated in conjunction with the chapter on the modern movement, we will defer detailing it until then. In this foreign exhibit we have a grand opportunity to broaden our horizon, to see how our efforts compare with the recent tendencies of the older civilizations, and while we have much to learn from them, I believe that we may say without boasting that in modern work they are beginning to have as much, if not more, to learn from us.

WATER COLORS AND SKETCHES.

What a wealth of variety and charm there is in this section, where the architect can for once break loose from the fetters of the T-square and really express himself freely. We all know the most decorative perspectives and sketches of Birch Burdette Long, who, with his some fifty exhibits, gives us an exceptional chance to study his methods. A bridge in sages and grays, Colton

Hill and Gloucester, in the Edinburgh Series, and the Duomo in Florence, stand out particularly. Leisenring, with twenty water colors, shows us what can be done with a few strokes of the pencil and a few simple washes on a gray or brown paper, provided that it be done just right, as for example several sketches along the quays in Venice, or the rich possibilities of color and atmosphere similarly gained, as in St. Mark's in Venice. Quite in another handling, but just as effective, are the brilliant Venetian water colors of H. G. Ripley's, or the broadly-handled Paris and Rome water colors of William Crowell. E. J. Weber shows some of the possibilities of a good handling of charcoal, and Licht and V. H. Bailey those of a knowledge of the pencil. The same is true of a number of broadly-handled pencil or sanguine studies of picturesque bits in England, by Benno Janssen. F. V. Murphy and Watnough show other interesting measured drawings and sketches in Italy. F. R. Walker exhibits some charmingly rendered drawings. F. C. Brown shows some very decorative perspectives for country houses. In the same room we find a large exhibit of the well-known decorative paintings and panels of Blashfield and C. Y. Turner centering about the latter's decorations for the Lewisohn house.



CHURCH OF THE NATIVITY CRAFTON PA

O.M. TOPP ARCHITECT

HOUSE OF SCHENLEY FARMS CO., PITTSBURGH, PA. JANSSEN & ABBOTT, ARCHITECTS.

SKETCH FOR RESIDENCE ON WOODLAND ROAD, PITTSBURGH, PA. MAC CLURE & SPAHR, ARCHITECTS.

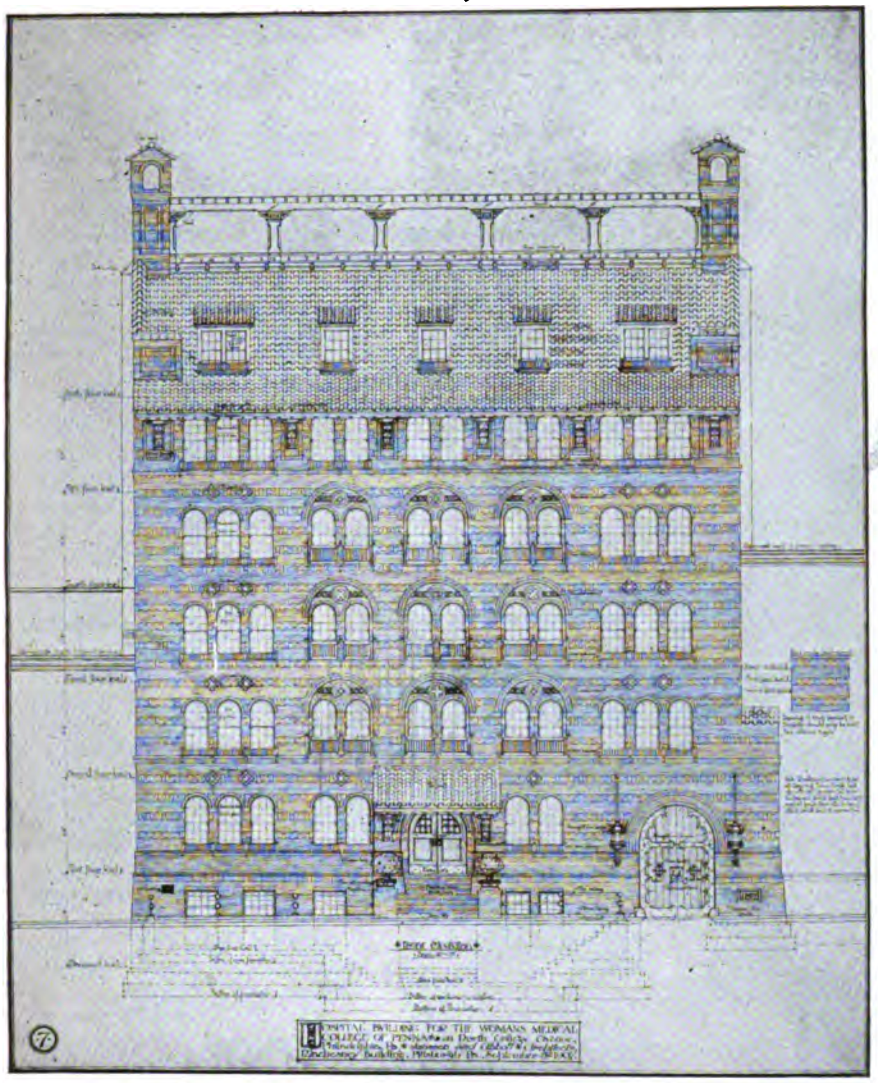
Directly allied to the above is a large collection of studies of stained glass, including twenty-six exhibits by Harry E. Goodhue and twenty by William L. Harris. Of the former we must note the admirable composition and color of the Bowden memorial window at Glens Falls, N. Y., the Gothic design for a chapel window in Louisville, Ky., and the big mosaic effect of the east window in Emmanuel Church at Newport, R. I. Harris' studies for six evangelists for the Paulist Church in New York are well conceived. Walter Ball and G. W. Sotter exhibit some interesting studies of windows in Chartres, and of especial interest in the D'Ascenzo Studios' exhibit are the windows for the Overbrook Church.

CHURCHES.

It is a new idea to have a whole gallery devoted to churches, yet one is easily filled here; Cram, Goodhue & Ferguson and Maginnis, Walsh & Sullivan each sending a large exhibit chiefly composed of buildings already well known to the architectural public. Brigham exhibits the Scientist Temple in Boston; Heins & Lafarge, St. Matthew's in Washington; Barnett, Haynes & Barnett, the St. Louis Cathedral; R. W. Gibson, the St. Thomas, N. Y., competition drawings; E. Stolz, St. Kiernan's R. C. church in Pittsburgh; J. F. Comes, two Italian church designs; Geo. F. Newton, a Malden, Mass., church; C. R. Greco, the Church of the Blessed Sacrament in Cambrideg, Mass.; Howells & Stokes, the interior of the new Columbia chapel, and J. W. Donahue a very odd but interesting church near Springfield, Mass.

GENERAL SECTION.

In the General Section we cannot begin to enumerate all the objects of interest. The following, however, will give a clue to them and an idea of their extent: Of the recent competitions the International Bureau of South American Republics is here exhibited for the first time, and Kelsey & Cret's design has most de-



HOSPITAL FOR THE WOMAN'S MEDICAL COLLEGE, PHILADELPHIA, PA.
Janssen & Abbott, Architects.

servedly proved a centre of interest for visiting architects. Haight & Githens, Nelson & Van Wagenen and Ripley & Russell all exhibit competitive drawings for the same. Allen & Collens exhibit the Union Theological School winning drawings; Hale & Rogers the Shelby County Court-house, the Engineering Building in New York, and Mr. Rogers the Peter G. Thomson house at Cincinnati. Price & McLanahan show some broadly handled pencil perspectives and sketches of the Scott house in Ardmore, Pa., and the Schoen house at Rose Valley. Janssen & Abbott of Pittsburgh show well-studied designs for a jewelry store in Pittsburgh, a brick hospital in Philadelphia, and a number of drawings and models of most picturesque English country houses at Schenley Farms, Pittsburgh. Kiehnel & Elliott of Pittsburgh show a well-arranged High School at Newcastle, Pa. Trowbridge & Ackerman show the Scranton station. Hornbostel shows his exquisite design for the Soldiers' Memorial at Pittsburgh, and large pencil sketches in his well-known manner of the schools, the Pittsburgh Court-house tower, the Stadium and many country houses. Milton I. Dyer shows the Tavern Club and a number of houses, also beautifully drawn façades and details of the Cleveland bank. Geo. H. Steffens shows a photograph of an originally treated brick and stone apartment house in Cleveland, several private houses and his competition plans for the education building at Albany. Frank Miles Day & Brother exhibit perspectives of two admirable country houses. Osterling of Pittsburgh has his Union National Bank, his hotel at Cape May and the Commonwealth Building at Pittsburgh. W. W. Bosworth of New York has an interesting exhibit in the big Italian garden for W. D. Rockefeller at Pocantico Hills. G. W. and W. D. Hewitt have a well-studied house and island plan. MacClure & Spahr show drawings for the Union National Bank at Pittsburgh. Freedlander shows his competitive design for the Albany educational buildings. Delano & Aldrich are represented by two perspectives of their casino at Huntington, L. I. R. C. Sturgis shows the First National Bank of Boston, and Cass Gilbert drawings and photos of the West Street Building and the Union Theological Seminary competition.

In landscape, Pray, Hubbard & White exhibit a charming layout in Brookline.

In faïence the Grueby Faïence Co. make a most interesting exhibit.

Among the plaster casts D. H. Burnham shows general casts and details of the Merchants' National Bank in Indianapolis and the Commercial National Bank in Chicago. Janssen & Abbott and Bilquist & Lee show some eight models for houses at Schenley Farms, Pittsburgh.

In sculpture we must look at Zeller's admirable bronze bust of Buffalo Bill and his photographs of the statues on the Custom House in New York. Carl Bitter shows a photo of the Sigel statue, Elwell the dispatch rider.

Steen at the Carnegie Schools shows some well-handled animal heads.

We see how varied is the ground and how representative of different cities and types of work.

MODERN MOVEMENT.

And now we come to the section which distinguishes this exhibition from all previous architectural exhibitions in America, a section devoted to the so-called "Modern Movement" or "New Movement." For the first time we have a real opportunity to study and compare side by side the various at-

HOTEL RESTAURANT, CHATEAU DES BEAUX ARTS, HUNTINGTON, L. I.
Delano & Aldrich and M. J. Prevot, Architects.

tempts of American architecture to assert itself as something living, virile, forceful, with a power to think and act for itself, not as a servile adapter of the heritage of previous civilizations,

GARDEN AT WELD, BROOKLINE, MASS. C. A. PLATT, ARCHITECT.

as a mind which has something to say and says it, and not as a mere mimic of the ideas of others. These attempts are not all successful. Many of them leave much to be desired, but whether they arrive at something tangible or no, it is the very attempt which counts, it is this very striving on the part of so many different minds in so many localities to express what their taste and conscientious study convinces them to be the logical solution of a problem that proves that we are not an effete nation in the arts any more than in our industrial life. So far, how far behind the other phases of our life and growth the arts and architecture in particular have lagged! But here we have a great bounding of hope, for the impressiveness of this multiphased collection of works all striving to one end cannot but convince us that the tide has at last turned and is already setting in strongly in the direction of a real American architecture for the Americans, an architecture which shall present before all the world a picture in permanent materials of those qualities which have in other lines put America in the wonderful position she occupies to-day. And so as we look about among these exhibits we try, each according to his own lights, to pick and choose those features which must live and which in the aggregate will at some near future date be incorporated fundamentally in that much-longed-for goal of all Americans, a real American architecture. Whether it be in the charmingly imaginative and decorative treatment used by the father of this modern movement, Louis H. Sullivan, or in the most decorative, somewhat Japanese handling of F. L. Wright, or in the severer work along similar lines of Dean & Dean, or in the most individual adaptation of modern *école* tendencies of Hornbostel or the straightforward, artistic use of materials for themselves of Grosvenor Atterbury, or in the somewhat modern German tendencies of W. B. Griffin and G. W. Maher, or in the bald and severe but logical treatment of masses for themselves of D. H. Perkins, or in the personal French *Art Moderne* tendencies of Herts & Tallant that we find the real essence of our future architecture, remains to be seen. It will probably, however, draw in greater or less degree from all. Each of these and many others besides must contribute to the culmination of that art which cannot be the sole possession of any one personality, however strong, but must be a gradual logical growth, the accumulation from many minds and individual points of view, all working toward one common end. And so as we walk about this exhibit we feel a certain responsibility devolving on us to choose wisely and to endeavor to profit by this study in our own design, taking to ourselves that which is good and rejecting that

RESIDENCE OF MR. W. P. SNYDER, SEWICKLEY HEIGHTS, PA. GEO. S. ORTH & BRO., ARCHITECTS.

VILLA HUESGEN, TRABEN a. M., GERMANY.
Professor Bruno Mohring, Architect.

VILLA WERNER, NEAR POTSDAM, GERMANY.
Professor Bruno Mohring, Architect.

which experience proves is unfit. It is unfortunate that Louis H. Sullivan is represented by only one exhibit, a plaster model of a beautiful capital, but that alone is sufficient to show his wonderful creative force and mastery of detail. We could not in any exhibition pass by the most decorative presentations of Frank Lloyd Wright without stopping to study them, with their happy contrasts of big wall surfaces and well-placed and proportioned voids and ornament. How well the house nestles into its setting of gardens, lawns, trees and shrubs. How the hanging vines from window boxes add the one note of color necessary to break the monotony of the big surfaces and tie them into their setting. What a home-like and cosy feeling is evolved by the use of big simple roofs, as in the house for F. W. Little at Peoria, or by the happy grouping of broad horizontal lines as in the house for Mr. Coonley at Riverside, Ill., or that for Mr. Show at Montreal, Canada, or by the exceptionally artistic grouping of windows in the house for Mr. Hardy at Racine, Wis. Yes, among these twelve drawings there is a predominant sentiment of hominess, of livableness, worked out most freely and in each case adapted to the peculiar needs of the problem. Similar in the use of horizontal and vertical lines, but quite different in the boldness and frankness of their masses are the Chicago schools of Dwight H. Perkins and the St. Louis schools of William B. Ittner, buildings logical and unostentatiously adapted to their purpose. Of quite another character is the work of Grosvenor Atterbury, which has no marked style, but which depends for its effects on a logical and artistic use of materials, particularly in evidence in the colored tile and brick interior of the new Phipps natatorium at Pittsburgh or the façade and court of the Phipps model tenements in New York. Several houses and a shooting lodge all quite different, yet each worthy of study, especially a house at Ridgefield, Conn., complete his twenty-two exhibits. Considerable promise, especially in happy color contrasts, is shown in a small bank and a country house of Aymar Embury's. Dean & Dean, with some twenty exhibits, show considerable force in their bold, outspoken handling of the music building for Doane College, Crete, Neb., and in many features of the fraternity house at Cornell. Of quite another sort is the work of G. W. Maher in the rather German *Art Moderne* tendencies of his houses at Kenilworth, Ill., and Highland Park, Ill. Simple lines and big surface make these most attractive, as is also the picturesqueness of a garden porch built about a large tree. Illustrations of this modern work will be found on the inset plates of this number.

By way of comparison at this point we must look for a moment at the modern German work previously alluded to, especially at that of Prof. Bruno Mohring of Berlin. What could be simpler and more home-like than his villa at Potsdam, with its roomy loggia nestled between two octagonal bays, the plaster frankly decorated in lines and panels, all grouped under a single square roof, or the broad plaster treatment of the high gabled house at Mosel. We must study, too, the great church at Strehlen by Schilling & Graebner of Dresden, too spotty in mass but most free and imaginative and full of scale in many of its motifs. Then, too, we must not miss the suggestions in the wood and plaster treatment of a summer house by Prof. Oswin Hempel of Dresden and especially the delightful handling of interiors as to color and material, all in a new way, by Curjel & Moser, or M. H. Kuhne, or Prof. Halmhuber, or Prof. Fritz Schumacher. The Germans are working in different directions from us, but well they should when we consider the different conditions of the two countries.

And complementary with this new movement in architecture is that of the allied arts of furniture and furnishings, fixtures, stuffs or stained glass, the last of which we have mentioned.

And so we leave this exhibition with a feeling of having well spent our time. Examples of the work of a number of the big well-known firms is absent, but we have that always about us in execution. It is the work of the younger and more enthusiastic men we wish to see, for it is on them that the future of architecture in America depends, and it is in the work of these men who are not too busy to give each piece of work their personal interest and attention that we can find that which by comparison may be of inspiration or profit to us. And it is at Pittsburgh, with its nearly 1,500 exhibits, all well grouped, that we can for the first time in America carry on such a study. G. B. FORD.

The American Institute of Architects—Its Aims and Uses*

"SOME time ago I was asked to state the reasons for the existence of the American Institute of Architects, the principles for which it stands and the ends for which it strives.

"It seems to me that this occasion on which so many members have gathered and on which so many friends show their interest in our art and our affairs is one on which some such statement may well be attempted.

"The men who founded the Institute declared they wished to 'unite in fellowship the architects' of this country. That was their first object and it has been largely realized. If we consider the state of the profession fifty years ago, when, as those who knew it say, every man's hand was against his brother, when the ordinary amenities of professional conduct were almost unknown, we must agree that a very substantial advance has been made. Even in the twenty years of my own experience, I can see a change from detraction and distrust to respect and friendship among architects. I would not be held to assume that all this improvement is due to the existence of the Institute, yet I think that much of it is. The millennium is not yet at hand, and there is still a field for such civilizing work. And as long as men of fair skill and of reasonably high standards of conduct are not joined with us, we ought to feel that we have not pushed this matter far enough, because the mere bringing together of men striving for a worthy cause unites them in fellowship.

"But the founders went on to say that they wanted to combine the efforts of American architects 'to promote the artistic, scientific and practical efficiency of the profession.' And I doubt whether we could even now make a better definition of such of our aims as concern ourselves alone. Things have changed a good deal in the fifty years of the Institute's existence. The architect is a much larger factor in the scheme of American civilization than he then was. The picture of this change, Mr. Post, who has been an eye witness of it, drew when he said: 'Fifty years ago the architect had but little status in the community, either as a man of science or of affairs—still less as an artist. He was regarded by the general public as a mere harmless dilettante. To-day the architect is the accepted arbiter in all matters connected with the building art; he is recognized as the acute man of business, without whose aid no structure, from the cottage to the palace, from the skyscraper to the capitol of a commonwealth, can be judiciously or economically constructed.' But the subjects with which the Institute has concerned itself have changed but little in these fifty years. Chiefly they are as the founders defined them—artistic, scientific, practical.

MONUMENT KAYER IN CEMETERY, TRABEN a. M., GERMANY. PROFESSOR BRUNO MOHRING, ARCHITECT.

"And, since the very thing that distinguishes architecture from mere building is that it rises to the level of the fine arts, that it is the mother of those arts, it is but natural that our first concern should be with matters of art. But art is a very subtle thing, difficult to express in words, needing indeed, in the one who would talk about it, some special aptitude or training quite different from that of the man who practices it. And, since the men who make this body what it is are those who do indeed practice their art, it is not to be wondered at that they have not much to say about that art as such. Doers, as you remember, are no great talkers.

"And this may account for the unquestioned fact that this Institute hears but few papers on the art of architecture. Not that it is in the least unmindful of that art, for we all realize that it is because that art is at bottom the thing we care for more than all else that we come together to talk of other things, things that bear on it, things that make for it or against it, things out of which it is more possible for us to get value through the use of mere words.

"Yet there are always some among us who have a concern to

*Address of President Frank Miles Day at the Forty-first Annual Convention, held at Chicago, November 18, 19 and 20, 1907.

speak their minds upon the outward manner of our art, fearing or hoping as the wind seems to set from mediæval England, or Renaissance Italy or modern France, and others who feel especially charged to make report upon the influence that changing materials and methods of construction have upon our art, things which, though they be but media of expression, bear to us in a sense the same relation that the instruments of the orchestra with all their tonal qualities and all their difficulties and limitations, bear to the composer.

"Strangely at variance with the habit of similar institutions in old countries is ours, in that we have naught to say about the history of our art. Our life is so much of the present, so fully are we occupied in doing, that our records carry nothing of the fruits of archæology which so, shall I say, burden or enrich that achievement to a higher. There art is sterile, there fertile; it advances, it retreats; it is in science that men rise on stepping stones of their dead selves to higher things. To-day any plodding astronomer can do things that would have staggered Sir Isaac Newton. Science comes on like a great tide that knows no ebb. And irresistibly the scientific side of the architect's work gains power over him; it needs not the Institute to forward him in such affairs. And the Institute need not go far afield to be furnished with papers on everything scientific, from the Least Radius of Gyration to the Maximum Frequency of Alternation in a Multi-polar Generator.

"It is in practical affairs, however, that the Institute has found its widest usefulness to its members. By bringing to bear upon the conduct of our work the united experience and wisdom of the

HOUSE OF G. DRANTZ, IN HEILBRONN a. M., GERMANY. BEUTINZER & STEINER, ARCHITECTS

those of our sister societies. We are not troubled by such men as excited the scorn of Whistler, wise with the wisdom of books, who frequent museums and burrow in crypts; comparing, compiling, classifying, contradicting. Experts for whom a date is—success. Careful in scrutiny, conscientious of judgment, establishing with due weight facts of absolute unimportance. We, however, are by the stir of the times, and the very nature of our environment, not likely to mistake archæology for art—fortunate, rather, if in the haste of our lives, and under the burden of practical things, sometimes we may make a building worthy to go down the ages as an expression of the civilization of our day.

"If we have but little to say about art, we are careful to show in our selection of those whom we elect to Honorary or Corresponding Membership and those whom we raise to the rank of Fellowship, that whatever weight other considerations may have, the one that bears down the beam of the scale is the man's ability as an artist, just as in the award of the Institute's gold medal distinguished achievement is the determining factor.

"In the second class of subjects, in which the founders hoped the Institute would forward its members, that is to say the scientific, there has been no lack of activity. How different in all ways are art and science. Art is personal. The masterpiece speaks forever of the master, and no little man can climb from

ablest men in the profession, we have made advances of great utility to all. The documents governing the relations of owner, contractor and architect, those schedules, contracts and specifications which have to be drawn with such exactness if they are to protect the interests of all, have for years received our careful study, and are now receiving it more fully than ever before. The Institute stands as the one recognized authority on all matters of professional practice. The question of whether it is a wise policy for the State to examine and license architects, as it does physicians, receives answers of wide diversity from the several parts of the country. It is a question that concerns the Institute, and it is a persistent one, but it has not the perennial life of our attempts at the regulation of competitions. That question is always before us. I will not say that we have made no headway toward abating its abuses. On the contrary, I think the work of the Institute has told strongly for the better conduct of all concerned. The proportion of well-regulated and honorably conducted competitions has greatly increased, and the number of competitions for trivial affairs, competitions used to cloak an appointment, competitions held without expert advice, without rules, without a jury, without award or even the promise of an award, is growing proportionately less. Few men who value their reputation take part in such affairs, and I wish I

could say that it was increasingly difficult to tempt men of more than average ability but of unestablished reputation into them. In this matter the Institute carries on an unending campaign for the education of the building public, and I regret to have to say it, of the profession itself. Deprecate the abuse and the wastefulness of competitions as we may, we cannot help admitting that, when properly conducted, they are of a certain utility in giving unknown men an opportunity to show their mettle, in stimulating most men to higher effort, and in bringing before competent judges many solutions of the same problem, made by men of varied training and predilections.

"The American Institute of Architects has had a deep influence upon its members, and through them upon architects in general, not alone in matters of practice but perhaps to a greater degree in matters of conduct. You cannot make a man either a gentleman or an honest fellow by telling him how to act, and if he have not the right instinct, no amount of instruction will supply the lack of it. Yet, if a man be somehow led to feel that there is a standard of conduct, even though unwritten, to which those about him conform and to which they expect him to conform, he will think twice before he falls below it. Such a standard the Institute maintains. No one can quite define it or set it down in rules, yet no differences of opinion ever arise among us in respect to a particular action, the Institute in its parts and as a whole clearly recognizing any infraction of its code. That this code should remain unwritten is to its advantage. As the general standard of professional conduct advances, the code changes with it. I have never known a case of retrogression; the standard always advances.

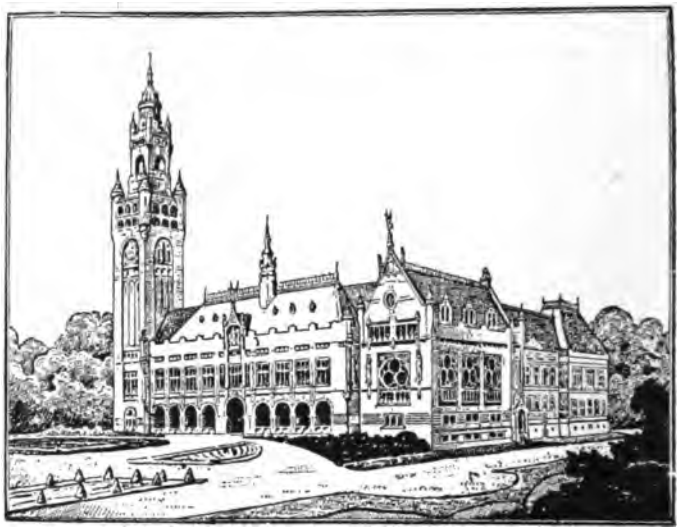
"So much for the influence of the Institute upon its members and the profession in general, and this seems to have been all that the founders had in mind. They failed to see (or was it only that they failed to say?) that the thing that they had founded could not be kept within their own description of it. The Institute's relation to the public is in some ways more important than its influence on its own members. Its voice is the voice of the profession and the public listens to it as such. It has had great influence in advancing the artistic standard of the buildings erected by the United States Government, and as the Government is the greatest builder in the country its standard is of high importance. The work of the architectural office in Washington, for many years under the guidance of members of the American Institute of Architects has steadily advanced from mediocrity to a point at which, under its present able head, it reaches the high standard of current private practice. Through the efforts of the Institute, at a time when this level has by no means been reached, an Act was passed enabling the Secretary of the Treasury to employ architects in private practice, and this has been done with notable results in Cleveland, Indianapolis, New York and many other cities.

"In educational matters, although the Institute has been by no means as active as it should have been, it is not without influence. Its high ideal of architectural education is voiced in the words in a report adopted only last year: 'The object of architectural education must be the breeding of men of cultivation, learning and broad sympathies, who understand the dignity and the significance of art, both as beauty and as language; who are perfectly proficient in the technique of the art they follow, and who can inspire, organize and direct widely different classes of men.' The Institute's interest in the American schools of architecture has always been well marked, and I am glad to say that our co-operation with those schools now gives promise of a means of comparison of their work that will be most useful. Through the efforts of members of this Institute, and under its auspices, the American Academy in Rome was founded. That Academy, dedicated to the advanced training of architects, painters, sculptors and musicians, and now finely lodged in its own Villa Mirafiore outside the Porta Pia, justly looks upon this Institute as its parent.

"Our relation to the public in matters of municipal improvement is one of which we may well feel a certain pride. The sentiment that resulted in the splendid scheme for the improvement of Washington was guided by our suggestions, and the men who so ably wrought out the problem came from our ranks That movement has spread from Washington throughout the country, and we have fostered it everywhere. Often it springs up at the suggestion of our Chapters, and wherever it goes it meets with their hearty co-operation. Our members are zealous in its support, and if the aspect of American cities is changing for the better, it is in part at least, because of our activity.

"It is in the service of the people, and not of its own members, that the Institute finds and will find its widest and best field. It is by unconsciously stimulating in its members a desire and ability to be of public service that it will find its greatest usefulness.

"A man, to whom I had not spoken, once turned to me and said, pretty brutally: 'What will I get out of the Institute if I join it?' 'Nothing,' I said, 'if you look at it in that way,' and that is true. It is the man who brings all that is best in him to the Institute that gets something out of it. Except for the pleasure and interest of a convention such as this, the Institute seems always to demand from its members more than it gives.



SECOND PROJECT OF M. CORDONNIER FOR THE PEACE PALACE AT THE HAGUE.

Can any man do useful work, the Institute demands it of him, and, busy though he be, he gives it. But what he gets in return is more precious than any gift he makes. It is the companionship of men whose careers enrich them with character. Men who strive for ideals in art; men who apply knowledge to grave problems of construction; men who master the ever increasing complexity of modern buildings; men who deal justly and hold an even mind among conflicting interests; men who carry vast responsibilities, not alone of money, but of lives and the chances of death; men who emerge from it all with broadened minds, with keener perceptions and a finer sense of honor. Such companionship is not the least of the rewards that the Institute offers to those who serve it with faithfulness and with singleness of purpose.

ILLUSTRATIONS

THE PITTSBURGH ARCHITECTURAL CLUB'S EXHIBITION.

The first three plates illustrate the "New Movement" in American architecture and show the following: A church and three dwellings by Frank Lloyd Wright, architect—A shooting lodge and two dwellings by Grosvenor Atterbury, architect—Exterior and interior view of a dwelling by Geo. W. Maher, architect—A music building by Dean & Dean, architects—An elementary school by D. H. Perkins, architect.

The fourth plate shows: A country house by Frank Miles Day & Bro., architects—A design for a residence by Lawrence Buck, architect—Garden view of a country house by Howard Shaw, architect.

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The Potter Manor, near Point Judith, R. I.: Four Pages of Measured Drawings—House of Dr. G. E. Monroe, Easthampton, Long Island, N. Y.: Two Plates—House of Mr. D. H. Rowland, Plainfield, N. J.—House of Mr. John P. Benson, Architect, Plainfield, N. J.

Additional: A Stone Fireplace of the Time of Henry II., from the Collection of the Late Stanford White—An Italian Renaissance Doorway from the Same Collection.

IT is very simple and proper, if not absolutely economical, for the United States Government to send to the "scrap heap" a war-vessel that may have cost millions, simply because a board of survey declares that the percentage of deterioration exceeded the limit set by Congress as justifying repairs. It is quite another matter, however, for a private owner of real estate who seeks to repair his ancient building to find himself refused a permit because the building-inspector finds the building has deteriorated beyond the limit established in the building-law, the result being that he must let his property continue to decay or else pull it down and rebuild under the stringent modern rules of construction. Many cities have a provision in their building ordinances declaring that when a structure has deteriorated through age, abuse or accident a certain percentage of its original value, usually forty or fifty per cent., it cannot be repaired except in a small and temporary way. The provision is an excellent one, and works as little hardship as the nature of the case allows. It is one of the agencies through which the combustible city of our fathers is naturally, if slowly, being abolished.

BUT the provision does work hardship, and in such case tempts the sufferer to seek relief at law, as is happening just now in Milwaukee, where a case will shortly be argued before the Supreme Court of the State, and we hope we may not overlook the decision when it comes along, as it would probably have weight in similar cases brought in other places. The limit of deterioration in Milwaukee is fifty per cent., and when Isadore Leiser was told by the building-inspector that it would cost more than fifty per cent. of the original value of the building to make the needed repairs, and that therefore he would issue no permit, Leiser protested and then sought out a judge easy-going enough to issue a writ of mandamus ordering the inspector to grant the coveted permit. The inspector, however, refused to obey, and the case goes to the Supreme Court on his appeal.

ALTHOUGH the title "State, War and Navy Building" is distasteful and awkward, it has always seemed to fit the building at Washington that it belongs to, the last one designed during the Mullett régime, we believe; better than this, it is heraldically correct; for what more fitting "supporters" than military and naval force could the State have? But even heraldic propriety changes with the times, and it may be taken as symptomatic of the advances of civilization that we shall find presently that military and naval force have as supporters been displaced by commerce and labor. Rumor has it that the President is to urge the building of a new Departmental Building which shall house the official forces of the Departments of State and Commerce and Labor, the Secretary of State and his subordinates leaving their present crowded quarters, which will eagerly be absorbed by the equally cramped officials of the War and Navy Departments. There is probably good reason for the proposed exodus, but we think it will be unwise to repeat the mistake of having a single building in double occupancy, particularly when one of the tenants is as certain to grow as is the Department of Commerce and Labor. Next to the Capitol itself, the two most dignified and impressive buildings in Washington logically should be those that house the Departments of State and Justice. It is certain that the Department of Justice will have its own—dignified and impressive, we hope—building, and good sense would suggest that this new building should be paired off with an equally dignified building for the sole occupancy of the State Department—which, too, is sure to grow rapidly, now that the consular service has been taken strictly in hand.

THE Society of Beaux-Arts Architects is enviably fortunate. Last week it made announcement that it had received from Mrs. Harry Payne Whitney, Mrs.

Richard Auchmuty and Mr. W. K. Vanderbilt the sum of twenty thousand dollars as an endowment for the support of its "Paris Prize" man while passing through the First Class at the École des Beaux Arts. As the prize-winner receives from the Society one thousand dollars per year, or just the income from the sum named above, it is plain that the Society can send a beneficiary to Paris only every third year, unless it succeeds in increasing the present endowment by double its amount, or unless it can find generous friends who will guarantee the expenses of the men who might be sent to the École in the intervening years. It was the generosity of Messrs. Andrew Carnegie, J. Pierpont Morgan and A. D. Juillard that enabled the Society, in its unendowed days, to send over the three "Paris Prize" men who are now so successfully prosecuting their studies in Paris. Evidently there is some one in the Society who, failing as an architect—which heaven forfend—could succeed amply as a "promoter."

WE do not know why the editor of *Vogue* should feel impelled to undertake the rôle of Cassandra, and we may be sure that he really knows less about the future than did that unfortunate Trojan princess, but in a recent issue of his publication he declares that it is "the belief of those best informed that the average artist of to-day, especially the architect, will be a pauper ten years from now!" If we could only believe this modern prophet of evil, wide and universal, we should incline to advise him that it was his plain duty to get the ear of all the heads of the many schools of architecture and effectively persuade them to cease their efforts, since it is clearly a case of misdirected energy that prepares young men of brilliant promise—as we all know they are at the time of graduation—to reach pauperdom in ten short years.

THE New York Corporation Counsel may find aid and comfort in his impending crusade upon encroachments over the building-line along Fifth Avenue from what has happened in Brussels recently. As we have already narrated, the municipality held up the building of a new wing of the Royal Palace, on the ground that it was trespassing on the city's territory. This contention has just been sustained by the court, which has ordered the demolition of the offending parts. Unfortunately for the architect, M. Maquet, the court declares that he alone is responsible for the trespass, and that, therefore, the cost of removal must be discharged by him. If King Leopold should also incline to exact his pound of flesh, it is easy to see that here at least is an architect who is likely to become a pauper within less than ten years.

FOR many years the low birth-rate and the consequent practically stationary level of the population of their country has given grave concern to French economists, public officials and particularly to the military authorities. Explanations of the facts have been as various as the remedies that have been propounded for their removal. Amongst other things it has been pointed out that, if the birth-rate is to remain low, there is all the more reason for cherishing and rearing carefully those children who are born. Amongst others the Society of Economical Tenements for Large Families has undertaken to do its share and early this month opened to tenants the second of the tenements it has built, and built with the specific object of affording homes to those families so lucky as to have children. Thus in the building just completed it is hoped that there may be counted amongst the 620 persons it will house not less than 427 children, or an average of three children to each of the 94 families for whom apartments are provided. That the needs of the little ones have been carefully considered and provided for is shown by the fact that the stairways are provided with two sets of hand-rails, one at the usual level and the other lower down, so as to be in reach of childish hands.

THE Italian Minister of Public Instruction, Signor Rava, is about to introduce a bill in Parliament providing one hundred thousand dollars for the purchase and removal of the houses in the modern town of Resina that overlies buried Herculaneum, and a further sum of three thousand dollars with which to carry on the work of excavation for one year. It is gratifying to know that, at length, Professor Waldstein's efforts are to have fruition, although the annual appropriation of three thousand dollars for exploratory work seems pitifully inadequate, and we do not wonder that Professor Waldstein declares that it ought to be two hundred thousand. Commendatore Giacomo Boni, however, who has been for years carrying on explorations in the Forum and elsewhere, says that the smaller sum is sufficient, as the work requires great care and can be done only slowly. Americans, however, when they recall that after the lapse of five years the Campanile di San Marco is only about half rebuilt, though the job was not really a very large or difficult one, will incline to feel that the Italian methods are affected more by the status of the public exchequer than by the actual necessities of the problem in hand.

AS the disbelievers in the theory and practice of competitions may find the statistics useful in the forging of further arguments in favor of their contentions, we will say that the competition for the London County Hall—open to all the world—attracted 99 designs, only eight of which were submitted by other than English firms. In the preparation of these designs 152 architects, independent or collaborating, were engaged and this, of course, takes no account of the number of draughtsmen occupied in making the actual drawings, and these drawings footed up to the respectable total of 1,199, or an average of about twelve drawings to the set. With these figures the disbeliever can easily compute a very consoling total waste cost in pounds, shillings and pence.

Potter Manor

IN the country immediately inland from Point Judith—the Narragansett part of Rhode Island—stands what was once a great manor house on a vast estate. You will see it from the old Post Road, on a lane leading toward the Salt Pond—a small, low, barn-roofed structure, slowly falling to pieces though still tenanted by farmers, a plain, primitive house with one great square chimney in its centre, bearing a date, 1750, and nothing more.

One hears tales from the older inhabitants of the former magnificence of this place, built, it seems, at some period prior even to the date on the chimney, by one John Potter, grandson of an even older settler in these parts. The house stood originally three stories high, with a two-story wing for the slaves, and its present size is a result of the successive cutting down and alteration through many generations. Local tradition tells of a hall so large that a coach and four might have been driven under its arch, and of an establishment of a scale measurable only by that of the great Southern estates. Tradition also has it that this John Potter, 3d, was a clever counterfeiter; but local historians, winking at this phase of his character, paint him as a rare old gentleman of the old school, riding to hounds, drinking hard and entertaining royally with an open house, and lording it over hundreds of broad acres and more than a score of slaves. Even with a fair discount for legendary enlargement, these countryside tales point to a house by no means small, and move the antiquarian architect to investigate what remains of the interior.

POTTER MANOR, NEAR POINT JUDITH, R. I.

Here, even though little remains to supply exact or complete data, such architectural fragments as are left form interesting material for study and for comparison with the work of the South.

The house, as before stated, a four-square building perhaps fifty feet along the front with the great square chimney of plastered stone rising from the middle, is now by no means edifying, though undeniably suggestive of the simplicity and strength of the north. With fewer classical traditions than the more cultivated builders of the South, stately Greek porticos are much less frequently met with, even in the largest New England houses of the period, and a more severe and certainly more primitive style prevailed in these Narragansett manors, where the actual limitations as well as the desires of the builders are more or less expressed.

Four massive, semicircular steps of stone lead to an unpretentious door, with a plain architrave and simple, narrow side lights. This door, beaten gray with the winter storms of this bleak reach of coast, gives upon a very small square hall—a mere vestibule little more than five feet square. Here it may be said that the wide hall and sweeping stair of the Southern manors were things almost unknown in the North, where winters were bitterly cold and halls hard to heat. The entrance was usually little more than the modern storm-door and gave directly upon the rooms to the right and left. The hall in the Robinson manor, some miles north of this, was an unusually ambitious attempt in a hall, with beautiful spirally turned balusters and moulded walnut hand-rail. Quite as often as not the stairs were consigned to some dark back part of the house, and were narrow, steep, and ladder-like, sometimes built in the thickness of the wall—again a result of the heating problem.

Here, standing at the entrance, panelled doors open on the right and left, and a blank expanse of chimney-breast occupies the entire fourth side. This chimney is of stone and is over twenty feet square, resting in the cellar on a well-turned vault, built of old hand-made brick, imported, one is told, from Holland. The size of this great chimney is sufficient to suggest even more space than that actually occupied by the flues; possibly it contains some small room or cavity devised by the counterfeiter in view of his dangerous pastime. (When a similar chimney in an old house in Newport was torn down some years ago, a room over eight feet square was discovered, ventilated by a flue, and entered by a later bricked-up opening in one of the fireplaces.)

Owing to the many changes which the house has undergone, little or nothing can be accurately described or drawn except one room (supposedly the only one existing in its original condition), and certain parts of two others.

The room now the best preserved occupies the usual place of the so-called "best room," to the left of the entrance, and is about twenty feet square, nine feet three inches high, and is panelled from floor to ceiling on all four walls. The house stands almost exactly in the cardinal points, now facing east, and one enters this room from the north. The south and east walls are similar, being occupied each by two windows, interspaced with very large panels. Split pilasters, showing four flutes on a face, and a projection of one, fill the corners, and the elaborate cornice is broken out and returned above each of these and above each window.

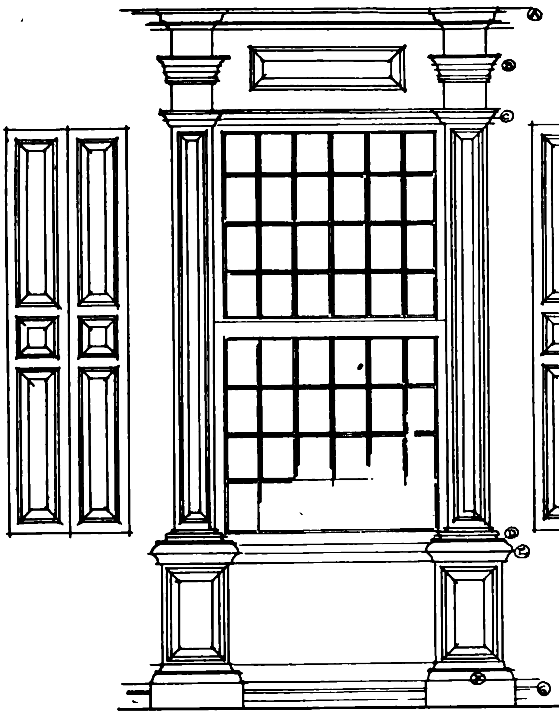
The key to the whole design is found in the north wall, and though the room is so low from floor to ceiling, the proportions are so well carried out that a much larger scale is suggested and the composition of the room as a whole is an excellent example of colonial work of the very earliest period.

On the central axis of the north wall is the fireplace, surrounded by an interesting moulding. As is usual in the buildings of this age and locality, no mantel shelf appears above the opening—a simple and very large panel fills the space to the cornice. This panel bore a large painting of some battle and has since been removed, its present owner unknown. The fireplace is flanked on either side by peculiarly graceful pilasters of rather interesting design. They are mounted on pedestals, which are deeply panelled, and capped with a combination of simple mouldings. The base moulding appears, oddly enough, in three distinctly different types, used, it seems, quite at random around the room. The pilaster itself, with a slight entasis, has seven flutes, and is capped with a double heading of mouldings, in place of any specific order of capital.

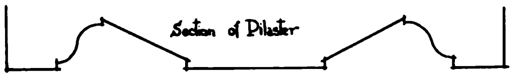
The remaining spaces on the wall, right and left, are occupied by two arches, filled, respectively, by a door and a shell-cabinet, the latter of great beauty and faultless workmanship.

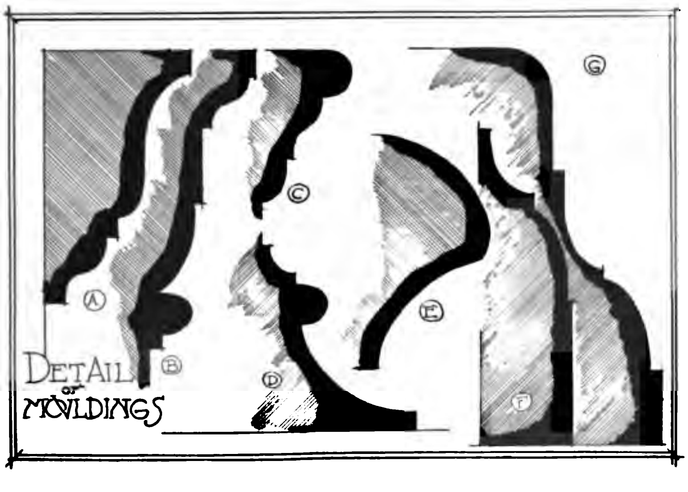
The door, which follows the line of the arch, is panelled, and fitted with a wrought-iron latch—the same, no doubt, that has opened and closed it for a century and a half. Over the door, as well as over the cabinet, are quaintly carved rosettes as corner ornaments, and a key-block completes the arches. The cornice is broken out and returned over each key, as well as at the split pilaster in each corner, and the flanking pilasters on each side of the center. The result is a very diversified and interesting shadow-line.

The shell-cabinet is as fine and beautifully executed an example of that early importation of a Renaissance motive from Georgian or pre-Georgian English detail as one may ever encounter, and must surely be the work of some master-joiner—possibly in England, though more probably in Newport, across the bay, where much of this sort of work was done.



ELEVATION OF WINDOW-POTTER MANOR





The cabinet occupies an apse-shaped cavity in the thickness of the chimney. The "shell" or "sun-burst" springing forward and outward from the back, in a true quarter-sphere. The little engaged pilaster-columns, gracefully proportioned and very delicately grooved, are capped by gilded mouldings, now much tarnished, and were originally painted in imitation of Tennessee marble, very dark, and done with a delicacy of touch and a depth of color rarely met with in such work. Three scalloped shelves for china are spaced in this part, and at the centre of the moulding above these is an oddly-carved, semicircular ornament of radiating leaves. From this as a centre spring the rays or flutes of the shell, twenty-one in number, and painted in dull green and gold, to the front of the cabinet. The construction of this shell is interesting, and seemingly obsolete, as a gentleman building in the vicinity, and desiring to reproduce a similar cabinet further up the State, was obliged to make the shell of plaster, because no carpenter would undertake the work. In the cabinet in the Potter manor the shell is cut, as if from a solid block, from a series of two-inch planks, corbelled out, and very skillfully dowelled and joined, so that not a single crack is visible. The apsidal form is perfectly true, as well, and the flutes and divisions spaced with geometrical precision, being all drawn with great nicety to a point behind the carved half-rosette at the back.

The elements in the entire wall as a whole, both in detail and in the general composition, are perhaps worth a brief analysis. In the detail it will be seen that the mouldings, which are purely classic in motive, are Georgian in composition and, in general, very full, and all the panels are very deeply cut. In the arrangement and design of the whole an obvious balance was plainly the aim, though in this scheme an odd defect or accident is apparent upon close examination. Instead of taking a central axis and placing the fireplace on this, and spacing right and left on each side, it would seem that the carpenter must have started at the right and worked toward the left. In the corners are the split pilasters. Almost adjoining the base of the right pilaster appears the door-arch, and at a distance equal to that of the corner pilasters, a full pilaster occupies the space to the left of the door. Next the wide fireplace, with its panel, and a second pilaster, perfectly balancing in spacing and position, the first. Then, also symmetrically spaced, appears the second arch, containing the shell and balancing the door, but leaving a much wider space between its trim and the corner than was left on the door-arch. This space was filled by the panel moulding found on the other walls, vertically spaced the same, even with a fragment of the chair-rail, but so narrowly mitred upon itself as completely to lose the panel. This was plainly an expedient, and could have played no part in the original design—the result, seemingly, of casual spacing and random arrangement, noticeable also in the south and east walls of the same room, and to a marked degree in the north wall of the main room in the Robinson manor, illustrated in The American Architect for September 14 last.

On the west wall of the room under discussion, running at right angles with the north, are three large panels, originally decorated, it is said, by portraits on the wood, of Washington, Martha Washington, and Lafayette. These, by some dull tenant, were at one time actually painted over, and when one remembers that Gilbert Stuart, born not far from here, worked through these parts in his apprentice days, the loss is full of interesting possibilities and surmises.

A door in this west wall leads to a small room which presents a greater puzzle than anything in the house. Running across the room, with a span of ten feet, is an elliptical arch, of beautiful proportions, springing from two low pseudo-Corinthian pilasters Although the work on these, as well as on the carved arch mouldings, is extremely rough, and much damaged by time and wear, the effect is remarkably rich and suggestive, and the design is small, indeed, in actual scale rather than in proportions. Enlarged and elaborated sufficiently, it would form a pleasing enough proscenium arch for a theatre. Behind this arch, at a distance of two feet, runs a wall, plainly of later erection, and so odd indeed is the appearance of this arch—almost monumental in proportion—in so small a room that one must suppose this to have been some kind of a hall-way—that hall, perhaps, through which a coach-and-four might have driven. Even this hypothesis is not very tenable, for the arrangement of the remaining front rooms, and the improbability of any mere hall so large in this type of house—both these facts contradict the hall idea, and leave the purpose of this big carved arch-way a complete enigma.

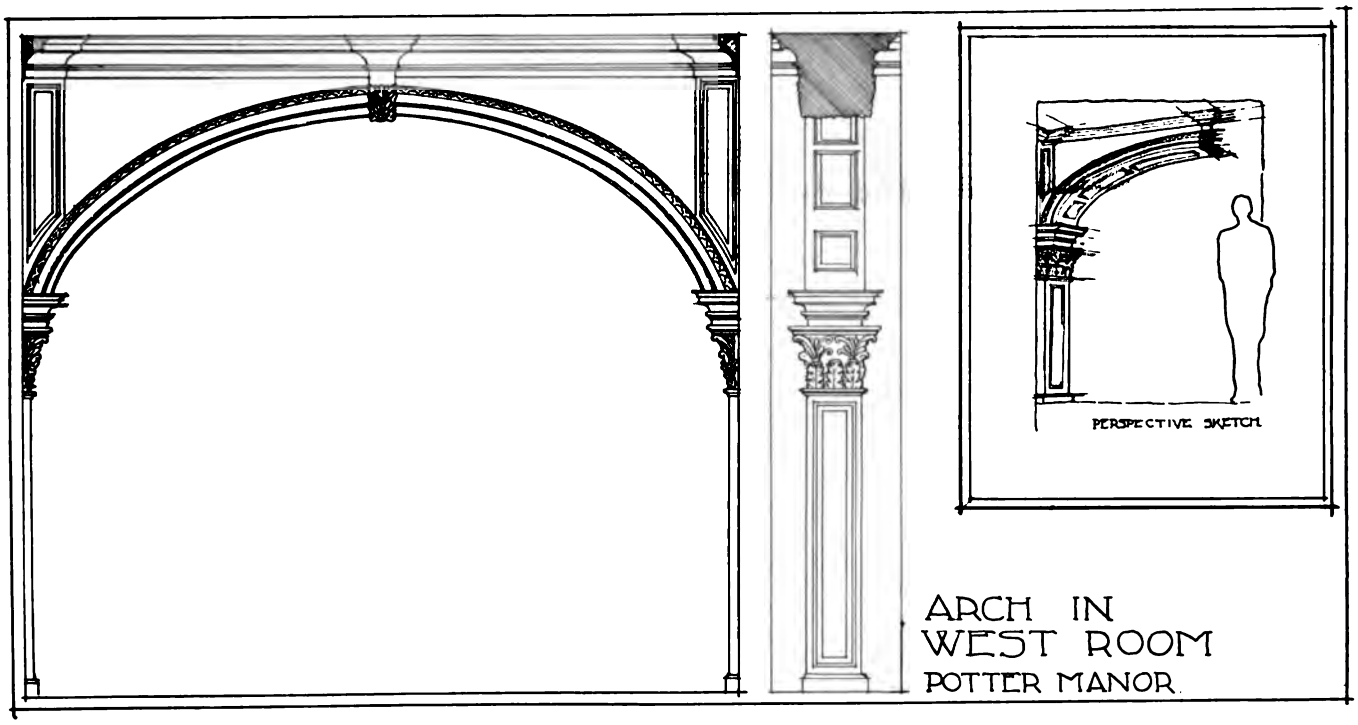
At this point the searcher is rewarded only with occasional panels, and disconnected bits of wainscot, the only other remain being a stately window in a part of a once-large room.

Such material, however, as is offered for study is of a most interesting nature, and the fact that even a conjectural restoration of the original house is quite impossible adds perhaps to the fascination of such fragments as remain.

Charles Matlack Price.

Personal Experiences With Reinforced Concrete[1]

THE first thing I take exception to in the report is the use of either cinder or coke-breeze, even if made with clean fresh water, as I have noticed failures taking place where this material has been used, and in all cases where I have had the work broken up the steel or iron has been badly oxidized. About twelve months ago I had a slab made of coke-breeze concrete 4 to 1, span 14 feet in the clear, and 6 inches thick.



POTTER MANOR, NEAR POINT JUDITH, R. I.

The reinforcement consisted of 1-2-inch rods, 4-inch pitch, with cross-rods 3-8 inch by 12-inch pitch. The 1-2-inch rods were 1 inch from bottom of slab to center of same. The rods were clean when put in, not oxidized or coated with a cement wash. The centering was left up for six weeks after it was made, and when struck there was a deflection of over 1-2 inch due to dead load only. About twelve months after being made the slab was broken and every rod was found badly oxidized, though the concrete to all appearance was perfectly solid. Another instance: A little less than two years ago we had thought of using (for a large work) the cinder obtained from the Liverpool destructors which was highly recommended as being perfectly satisfactory for concrete. I made some cubes in the proportion of 5 to 1, using a small amount of sand, and after seven days the crushing result was over 190 tons per square foot. When the cubes were twelve months old I observed that they were beginning to blow at several points on all faces. I then put a cube in the crushing machine, with the result that it collapsed at 123 tons per square foot—a fall of about 70 tons in twelve months. This decided me in the future never to use coke-breeze or cinder, as one cannot tell, except upon analysis, what impurities are in the material. With the ordinary coke-breeze employed by builders there are often small pieces of coal, and in course of time if the concrete is made hard and free from voids this coal will force off the surface, unless the gases can escape through the porous material.

I think it should have been stated in the Report that where concrete is used what one may call wet, very little punning is necessary, as it only forces the cement to the surface, which then runs away with the water. If the concrete is what is called dry mixed, then it must be thoroughly well punned, or else there will be little or no adhesion between the concrete and the steel reinforcement.

The reason why brick concrete suffers more than cinder concrete from fire is because very often the test has been made much too early, and the brick has not parted with its moisture; hence the formation of steam, which is bound to disintegrate the mass. If brick concrete were tested twelve months after being made I think you would find it would give better results in case of fire than any form of stone or cinder concrete.

I quite agree that the covering to the reinforcing in main beams should be 1½ inch to 2 inches as a maximum, but with reference to the floor slabs I am of opinion that ½ inch is ample.

With regard to columns 12 inches square and over, the centre of the rods should in all cases be not less than 3 inches from the faces. There will then be a considerable strengthening of the steel owing to the amount of concrete surrounding it.

With regard to the aggregate, I find from experience that if the size is ¾ inch down to ⅛ inch, and the sand from ⅛ inch down and mixed in the proportion that I have adopted of 5 to 1 (3 of stone, 2 of sand, and 1 of cement), it gives greater crushing results than where the stone is ¾ inch and over, except in the case of Portland-stone aggregate, when the difference in crushing is not so great. Unfortunately this stone cannot be used for reinforced concrete work owing to its being a limestone, otherwise greater strength could be obtained with Portland stone as an aggregate than with any other material.

There are great differences in strength between the various cements as made in this country. With regard to the ordinary cement of good quality, if I want to get a crushing resistance of 200 tons per square foot at six weeks I must make the proportion 4 to 1. If I want 200 tons per square foot, using a specially good cement, I can make it 6½ or 7 to 1, and for 300 tons per square foot concrete with the same specially made cement I use 5 to 1, and if I want 400 tons per square foot I use 4 to 1. For the latter, and using ordinary cement, the stuff would have to be made perhaps 2 to 1 or even stronger. I generally allow in my calculations for ordinary work that the concrete shall stand 200 tons per square foot, and everything is based on this assumption, except in the cases of columns desired to be made as small as possible: these I work up to 300 or 400 tons per square foot at six weeks old. With regard to the testing, it is of very little use to make your cubes for testing at the same time as the work is being constructed. What I do is to make the test before any of the work is done, and at the end of seven days I can tell by resistance to crushing what its value is going to be in two months, or its ultimate crushing after a lapse of four or five years. If I find the seven-day result

[1]Some observations by Mr. E. P. Wells, C.E., on the Report on Reinforced Concrete by the Committee of the Royal Institute of Architects [See "American Architect" for June 22, 1907].

is falling below what it ought to be, then I have other cement brought on to the works, or an increased amount added to bring the crushing up to the required standard. I am glad to see that you recommend that the tests should not be made until two months have elapsed in the winter time; if it has been a severe winter the interval ought to be increased from two and a half to three months.

I quite agree that the test load should not exceed one-and-a-half the accidental or live load.

With regard to the loads coming on to columns or piers in buildings, I see the Committee recommend certain percentages to be deducted from the accidental loads on each floor until such time as the reduction amounts to 50 per cent. of the assumed load on the floor. This, I think, is quite in order for any building that is used for offices or private dwellings; but in the case of a factory or warehouse, where the floors may be and often are loaded up to their full, no deductions should be made for these loads. In the case of the foundations to a column, they should in all cases be calculated on the assumption that every floor will have to sustain the full working load.

Working Stresses.—The working stresses given are low for a concrete that will crush at 200 tons per square foot at a month. I, as a rule, allow for concrete in compression in beams subjected to bending 600 lbs. per square inch, whereas I might allow with safety 800 lbs. per square inch, which would then give me a factor of 4 to 1 in the concrete. I am a great believer in having a higher factor in the concrete than you have in the steel, as I find that the richer and the stronger the concrete is to resist compression, the stronger is the beam and the greater is the adhesion or friction of concrete to the metal. A low crushing resistance in concrete does not give much adhesion, and when loaded up to one-third or less of its ultimate crushing it will begin to show signs of a permanent set.

While I am speaking upon this subject I will give you the result of a cube that I tested on May 4, 1899, which was made on April 27, 1898. The cube was 4 inches by 4 inches, and was made of 4 to 1 concrete, the aggregate and the sand being Guernsey granite.

The block was put in the crushing machine at 4:25 P.M. on May 4, and when 44 tons was applied the set or compression was nil; at 50 tons nil.

At 60½ tons the compression was 1-2000 of an inch
" 70½ " " 2-2000 "
" 80½ " " 4-2000 "
" 90½ " " 5-2000 "
" 100½ " " 8-2000 "

At noon on May 5th the compression was 11-2000 of an inch.
" 3.50 " 6th " 13-2000 "
" 4.30 " 13th " 14-2000 "

So that between May 4, when the load of 100½ tons per square foot on the block was applied, and May 13 it had compressed 6-2000 of an inch. The block was then tested to destruction and broke at 183 tons per square foot. This shows that with a block of this strength one-third the ultimate crushing has practically had no effect on the concrete. Sixty tons per square foot gives about 933 lbs. per square inch. So if a T-headed slab is worked out for 600 lbs. per square inch, and tested with 50 per cent. additional loading, there could not be any permanent set in the concrete. The tests that I am getting now at six weeks are nearly double 183 tons per square foot owing to the cement being of a proper nature and much more finely ground. I allow for concrete in columns in all cases 600 lbs. per square inch, if I use a richer concrete 900 lbs. per square inch, and if I use a very rich concrete then 1,100 to 1,200 lbs. per square inch.

With regard to the Committee's recommendation that concrete in shear in beams should only stand a stress of 60 lbs. per square inch, this is, in my opinion, very low indeed, and I should say this has been obtained from American tests of a lean concrete. I made a test some short time ago which gave for 6 to 1 concrete 484 lbs. per square inch as the ultimate. Another test with 5 to 1 concrete gave 500 lbs. per square inch.

I had some tests made with 5 to 1 concrete made as follows: Three parts of Spurn gravel ¾ down, 2 parts of Spurn sand, and 1 part of cement. The cement used was the "Pelican" brand of Messrs. G. & T. Earle, Ltd., of Hull, the water used for gauging being 9.7 per cent. When thirty-one days old the cubes were tested by Messrs. David Kirkaldy & Son both for compression and for shear. The compression tests are as follows: No. 1, 5,545 lbs.; No. 2, 4,451 lbs.; and No. 3, 5,166 lbs. per square inch, or 356.6 tons, 286.2 tons, and 332.2 tons, giving an average of 325 tons per square foot. These cubes were made at the same time as the test pieces made for shear, and from the same gauging. I cannot do better than quote Messrs. Kirkaldy's letter, because I think the results obtained do not, in my opinion, give the true resistance to shear. Messrs. Kirkaldy's letter is as follows:

"We have the pleasure to enclose herewith the report upon the crushing tests, but we are not issuing an official report upon the shearing tests, as we do not feel satisfied that we entirely obviated all bending moment. The fractures show good shear, however.

"As a matter of interest we give below the results obtained upon the shearing specimens:

Test No.	Length	Breadth	Depth	Sectional Area	Total Stress	Double Shear per Sq. In.	Single Shear per Sq. In.
P.P.	*Ins.*	*Ins.*	*Ins.*	*Sq. Ins.*	*Lbs.*	*Lbs.*	*Lbs.*
2943	24.00	6.06	6.02	36.48	39,450	1,081	540
2944	24.00	6.07	6.03	36.60	38,000	1,038	519
2945	24.00	6.06	6.08	36.84	43,400	1,178	589

Weight of sample: P.P. 2943, 74.71 lbs.; P.P. 2944, 74.58 lbs.; P.P. 2945, 74.75 lbs.

"We should be interested to learn the proportion of aggregate to cement in the concrete at your convenience, so that we may record same in our books in the usual way."

You will observe here that the lowest is 519 lbs., and the highest 589 lbs. per square inch, but the crux of the whole question is in their remark, "we do not feel satisfied that we entirely obviated all bending moment." I think that when a test is made for shear the test specimen should be thoroughly well held down to prevent any tilting of the beam; and until this is done I do not think that any satisfactory conclusion can be arrived at. According to the tests it looks as if, assuming that no bending moment was put into the shearing piece, that shear may be taken anywhere between 10 and 11 per cent. of the ultimate crushing. It is my opinion—I may be wrong—that the shear, if correct, ought to be somewhere about 40 per cent. of the ultimate crushing. I intend having some rectangular beams made heavily reinforced in compression and tension, and the reinforcement members carried to within one foot of the points of support of the abutments. I shall make the reinforcement so heavy that the beam has got to shear. I shall then find out what is the correct shear in the beam when subjected to bending.

With regard to the adhesion of concrete to metal being 100 lbs. per square inch, this I consider very much too low indeed, especially for a 5 to 1 concrete. For 8 to 1 it is about right.

The whole of the Committee's formulæ for beam calculation is very interesting indeed, but at the same time cannot be used for the present-day method of doing work—viz., eternal rush. One has to make empirical formulæ so as to save time, and always to be on the safe side. This I have done in all my beam and column calculations; and as the work has in all cases stood the most satisfactory tests, I do not feel inclined to depart from the methods I have adopted. As I can do most of them on the back of an envelope, I do not feel inclined to waste a page of foolscap. With regard to beams of rectangular section, I nearly always adopt the double reinforcement, as I find it much cheaper, the amount of steel required in the compression of the beam being ever so much less in value than the amount of concrete that has to be put in to take up the compression coupled with vertical shear members. With regard to the T-section of beams I adopt as a rule a uniform breadth of slab for the compression half of 60 inches. This I consider is very conservative indeed, and I allow over this area a compression of 600 lbs. per square inch, which for a 4-inch slab equals 64 tons, a 4½-inch 73 tons, 5-inch 80 tons, 5½-inch 88 tons, and a 6-inch 96 tons. In making my calculations I allow for the effective depth to be from the axis of the steel reinforcing in tension to the centre of the T-slab, so that when I find any of my stresses are coming below the tons given above, no steel reinforcing is required in the compression half of the T-headed beam. You can easily see how this simplifies matters, and acts, you will find, everywhere in safe limits, even assuming that the concrete should not be all that is desired.

I notice that you find there is no satisfactory theory or trustworthy experiments from which the strength of rectangular slabs supported or fixed on all four edges can be determined.

I give you now the result of some slabs supported at ends only that were made from my designs for the Central London Railway. They were 2½ inches thick by 1 foot 7 inches wide. The concrete was 4 to 1. Crushed Thames ballast ⅝ down. Age when tested 35 days. With a clear span of 7 feet the beam took a distributed load of 4 tons before collapsing. It then failed in tension. The total area of reinforcement spread over the full breadth was .83 square inch, and the centre of the rods was ½ inch from the bottom or tension side of the slab. If you will go into this matter you will find that there were stresses in the steel and in the concrete that there had no business to be. Another case of a plain rectangular beam 6 inches by 6 inches, 5 feet clear span, concrete 5 to 1, composed as to 3:2:1, age six weeks, carried a central load of 2 tons before breaking. This beam had no steel reinforcement.

With regard to the columns, I have a very simple formula which I use for concrete, giving an ultimate resistance to crushing of 200 tons per square foot. As I previously stated, this is what I generally use for work that I design. I assume that the column, including the steel, is to carry 900 lbs. per square inch, 600 lbs. of which I allow to the concrete and 300 lbs. to the steel. I assume that the steel shall only carry 3 tons per square inch, and this gives 4½ per cent. of the full sectional area of the column. The reason why I keep to 3 tons is on account of the large amount of initial compression being put into the steel during the setting action of the concrete. This is disadvantageous for a column, but with regard to a beam or a floor slab is, in my opinion, one of the reasons why when such work is tested to destruction it gives theoretic stresses of the steel that the same cannot stand. When columns are tested to destruction they always collapse before the calculated load is reached, owing, I think, to the steel being calculated on too high a basis. When I use concrete crushing at 300 or 400 tons per square foot I am enabled to reduce the area of the column, but have to increase considerably the area of the steel so that the ultimate crushing may show that steel and concrete are balanced. I have an enormous amount of data at hand with reference to the crushing of concrete made with the finely ground cements that are now made in England. The other day a 5 to 1 concrete had a crushing resistance of 416 tons per square foot at twenty-eight days old, and with neat cement that was six months in water and twelve months in creosote crushed at 1,366 tons per quare foot, or about half the strength of wrought iron. The whole secret, in my opinion, of reinforced concrete work lies not so much in the fact of the steel reinforcement, which may be low, as in exceptionally strong or rich concrete. The richer the concrete, the greater adhesion to the steel, the greater amount of initial compression is put into the steel, the crushing stresses are largely increased, and there is no chance of the concrete failing in compression. I believe in having a factor in compression of at least 6 or 7 to 1, and there will be no failure; but with weak compression it will begin to show signs of failure very early.

Steel and Concrete as Fire Resistants

AFTER the formal meeting of the National Fire-Brigades' Union at the Town Hall, Bradford, England, and a luncheon given by the Lord Mayor, the members met to hear a paper by Mr. Edwin O. Sachs, vice-president; the subject being dealt with in a semi-popular manner with the object of getting the fire-brigade officers to use their influence in the country in order to stop the use of steel work which is not properly protected by concrete. The paper is given below.

Firemen naturally have a prejudice against so-called "fireproof" buildings. They see in them a series of hidden dangers when a fire arises, and they rightly prefer to face known dangers to hidden ones. This prejudice has been with the Fire Service for quite 50 years, in fact, ever since floors of large span, supported by steel stanchions and girders, have been put into buildings. Until recently, the prejudice has had good cause, but during the last ten years such considerable changes have taken place in building construction that it is no longer advisable to generalize, but to limit one's prejudices to the older type of so-called "fireproof" buildings, while discriminating carefully between the various modern types.

Of course, the direct cause for this prejudice is that steel expands with heat; and that, if the steel is not properly protected, this expansion takes place very soon, and, as the temperature rises, the expansion becomes so great that walls are thrown out, stanchions buckle, and a general collapse usually ensues.

Now, it is fully appreciated that combinations of steel and materials such as concrete are essential for modern building purposes where large floor spans and the least possible number of vertical obstructions are required by the owners of warehouses, factories, and shop property.

What you have thus got to do is to use all your efforts to see that in all buildings where steel is necessary the work is so put together and the steel so protected as to meet the fire hazard, and, generally speaking, this protection can be obtained without any great technical difficulty, and it is rarely a very expensive matter.

Steel properly protected by a good Portland cement concrete will do wonders even at high temperatures. The concrete sticks to it; the concrete is a good non-conductor, and thus prevents undue expansion; and, further, concrete approximately expands at the same ratio as steel does where such expansion takes place simultaneously, so that where expansion of the steel does actually take place the concrete covering rarely breaks away.

Of course, there are other materials with the aid of which some protection can be obtained. Brick can be used, and has advantages, but it is cumbersome. Terra-cotta may be used, but, speaking generally, it is unreliable; for the terra-cotta mostly met with is dense, hard and brittle; and thus flies with a rise of temperature. The porous terra-cotta—still but exceptionally seen—has its advantages, but its application often leads to difficulties. Suitable concrete is undoubtedly the best covering to advocate, and is most economically and reliably applied.

A rough rule-of-thumb estimate is that all steel should generally be protected by two inches of good Portland cement concrete, though even a thicker protection—say, up to three inches—is advisable for columns and stanchions.

When I speak of *good* concrete I mean a concrete that not only contains Portland cement made in accordance with the latest British standard (issued in 1907), but a concrete which comprises an aggregate which is not liable to fly and which, having an aggregate small in itself, will, even when the outer face flies, not come off in large pieces. Broken brick, furnace slag, clinker, etc., form excellent aggregates from the fire point of view, while Thames ballast and natural stone, though of considerable carrying power, have many disadvantages as fire-retardants. For size, all aggregates should pass a ¾-inch mesh.

Of course, in most modern warehouses, shop or factory buildings, steel stanchions, girders and lintels are used, and these have to be specially protected; but it should also be remembered that reinforced concrete is deservedly making rapid headway. A suitable reinforced concrete has all the elements for affording a high standard of fire protection. The amount of steel used is comparatively small, and the sections of steel are almost invariably under two inches in diameter. Nevertheless, the greatest possible care must be taken that the steel rods are properly protected, *i. e.*, well covered with concrete: a mere coating of the steel with ¼-inch or ½-inch, as may be seen on some important buildings not many miles from Bradford, will not suffice. A thin coating of concrete for such rods is a delusion and a snare. It is worse than having no coating at all, for it hides the steel without giving safety, while the hiding of the steel may encourage a false feeling of security. Steel rods in reinforced concrete require just as much attention from the fire point of view as steel in girders.

To arrive at an accurate conclusion as to the relative fire-resistance of building materials, and to thereby be enabled to present sound information which would lead to the prevention of fire, and more particularly to the prevention of the spread of fire in large buildings, the British Fire Prevention Committee was founded just ten years ago, in that fatal year of 1897, in which we had the great Charity Bazaar fire in Paris and the Cripplegate conflagration in London. The committee comprises some 500 members and subscribers, the membership being composed chiefly of architects, engineers, fire-brigade officers and insurance surveyors; and the subscribers being for the most part public authorities and public bodies, the public authorities including among others the Admiralty, the War Office, H.M. Office of Works, and other leading departments.

The committee set to work to create a testing station at which floors, partitions, and the like, both of the ordinary every-day type and those of a proprietary or patented character,

are tested under conditions as nearly as possible similar to those of an actual fire, a rule for the tests being that there should be uniformity of test for the purposes of comparison.

The conduct of the tests has been on somewhat exceptional lines, *i. e.*, on lines which precluded the possibility of comments or the expression of opinion among those who made the records, for the records have been limited to bare statements of facts illustrated by automatic temperature charts, photographs, etc. Further, the tests have been carried out by voluntary workers only, who, besides giving their time gratuitously, often contribute substantially to the expense, which, during the ten years in question, has exceeded £25,000.

Large testing chambers, either 10 ft. by 22 ft. or 15 ft. by 22 ft., were erected, and the fierceness and draught of the fire obtained by gas produced at the testing station, the temperature attainable being equal, when desired, to the maximum temperature met with in a conflagration, *i. e.*, 2,200 degrees Fahr.

Assuming a floor has to be tested, it would be put over one of these chambers measuring 15 ft. by 22 ft. (which is a fair floor span), then the fire would be lit, the temperature gradually increased and kept going for any period up to, say, four hours; the floor would then be subjected to water from a fire engine, and during the whole of the test the floor would be kept loaded to, say, a warehouse load of 2½ cwts. per foot super.

If a floor will stand that ordeal for four hours, it may be generally assumed that it would do for a fire-resisting building, and that, if not absolutely "fireproof," it will afford such protection against spread of fire for such a period as a good fire brigade requires to become master of the fire in question. To have withstood the four hours' test deservedly gives the floor the classification of affording "Full Protection."

If the floor would not stand up to quite this extent, it might stand up to say two hours, and the floor would then be reported as affording "partial" protection or it might only stand up for one hour, when it would be ranked as giving "temporary" protection.

And here I come to one of the points of my paper, and that is, for all of us to plainly acknowledge that whilst it is of no use to aspire to have commercial buildings absolutely "fireproof," it is quite possible they should afford substantial protection, known as "full protection." With steel and concrete properly applied, be it as steel frame covered with concrete, or in form of reinforced concrete, buildings can be put up, and are being put up, that will well stand a big fire for four hours.

On the other hand, where the owner cannot afford the money to make his building as fire-resisting as this, he can get a moderate amount of protection, such as that known as "partial" protection, or as "temporary" protection, and much lessen his cost.

But the building owner should discern whether he would like to have a building that will afford *partial* protection or *full* protection. He must do away with the idea that if he happens to spend a little money on fire protection work, or if he happens to spend a lot, but that lot indiscriminately, he is thereby obtaining a "fireproof" building. He is merely being fooled if he is led to think so.

Another point I would emphasise is that it is quite possible and comparatively inexpensive to get a steel and concrete building that affords "full protection" by applying a little care and forethought. Thus, when the local borough surveyor comes along and discusses some set of plans with you, as he should do if he is alive to your responsibility, and takes proper advice from the practical man who has to deal with the fires, then just keep your eyes open to the following three items, namely:

(1) See that your steel is protected, no matter where it is.
(2) See that it is protected with a good Portland cement concrete of proper aggregate.
(3) See that all external angles on the concrete coverings are rounded.

I will here give you an example of what I mean. Some Yorkshire people who have factories of no small importance proposed recently to put up two additional buildings in reinforced concrete. A specialist concrete firm prepared the plans. I was called in as consulting architect. I immediately saw faults, from the fire point of view. There were questions of aggregate, the rounding of exposed angles, the removal of so-called metal guards tied into the stanchions, etc., and even of getting the water drained off against water damage. I do not think my recommendations cost the owners 1 per cent. extra money, but they led to their having fire-resisting buildings, instead of the reverse.

I am fully aware that there are other points that you have to consider in regard to general fire protection, but I am now only speaking about the fire-resistance of steel and concrete, and not about the general lay-out of buildings.

If any combinations are put before you, such as steel with dense terra-cotta protective coverings, just put your foot down and say you will not have it; or, if a man says he will protect all his girders and stanchions, but that he can do without protecting his lintels in the windows, or wants to fix unprotected metal guards, why just give him a piece of your mind.

ILLUSTRATIONS

THE POTTER MANOR, NEAR POINT JUDITH, R. I.

The four pages of measured drawings of the remaining architectural features of this old building are supplemented by text illustrations in connection with the interesting article which appears in another column.

HOME OF DR. G. E. MONROE, EASTHAMPTON, LONG ISLAND, N. Y. MR. I. H. GREEN, JR., ARCHITECT.

In planning this cottage the characteristics sought to be attained were simplicity of design and economy in construction. With these objects in view the general character and simple lines of the houses built more than a century ago by the early settlers of Easthampton were followed so far as modern requirements would permit.

The interior finish is very plain with mouldings, doors, mantels and other details following closely the corresponding colonial work in the old Easthampton houses referred to.

HOUSE OF MR. D. H. ROWLAND, PLAINFIELD, N. J. MESSRS. MARSH & GETTE, ARCHITECTS.

A simplicity of treatment characterizes this house throughout. The outside walls are covered with wide clap-boards, the lower part of the shop-window bays on the front being made of Harvard brick. The floors of the entrance porch and veranda are of concrete. The interior finish is white enamel and mahogany doors with the exception of the living-room, kitchen and servants' quarters. The living-room is finished in chestnut stained green. The kitchen and servants rooms are finished in natural Georgia pine. The bathrooms have tile floors and base, the flooring for balance of house being of oak. All the rooms have open fireplaces with wood mantels. The third story has a large billiard room, two servants' rooms and bathroom, with additional ample storage room. A feature is the pot closet in the kitchen, the walls of which are lined with sheet copper. The house is heated by means of a hot-water system with indirect radiation for the first story.

HOUSE OF MR. JOHN P. BENSON, ARCHITECT, PLAINFIELD, N. J.

The house is of the usual frame construction. The cellar contains a laundry and photographic dark room besides the hot-air heater. Third floor has three servants' rooms and bath. Plumbing includes solid porcelain tubs; lighting by electricity and gas combination fixtures. Interior woodwork is white pine, painted throughout; hardwood floors. Exterior is covered with Norfolk cedar shingles, lapped three deep, and nine inches to the weather.

Additional Illustrations in the International Edition.

MANTEL: PERIOD OF HENRY II.

From the collection of the late Stanford White, Architect.

ITALIAN RENAISSANCE DOORWAY WITH ANTIQUE STONE BALUSTERS AND NEWELS.

From the same collection.

A part of the collection of the late Stanford White, not included in the contents of his house (which we illustrated in our issue of March 30, 1907), has just been disposed of at auction by the American Art Association. This collection, numbering more than six hundred and fifty pieces, consisted of many objects selected by Mr. White for his own use, as well as a large number of pieces intended to be used in the construction and embellishment of such buildings as he might be called upon to design.

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THE report presented at the recent convention of the American Institute of Architects by the Committee on Revision of Schedule of Charges and the more significant parts of the discussion that followed its reading are printed elsewhere in this number. The practical difficulties in the way of making anything like a perfect schedule—one that would suit alike practitioners in places so far apart as Portland and Los Angeles or so unequal in size as New York and Patchogue—are doubtless very great. It will be readily admitted that the five per cent. schedule is not suited to prevailing conditions everywhere and that the new schedule is an equitable one when used in cities of the first class, where the cost of running a well-equipped office has vastly increased of late years. But we cannot help wishing that a scheme could be devised which would permit self-respecting members of the Institute, working in the smaller and remoter places and inevitably controlled by local conditions, to collect their much lower percentage without feeling that they are so far transgressing the rules laid down by the Institute.

A VERY desirable addition to the committee's report would be a clear definition of what are the drawings, memoranda, specifications, and so on which constitute the "Preliminary Studies" and "Working Drawings and Specifications" upon the delivery of which certain payments to the architect fall due. When a piece of work is carried to completion the lack of such an official definition is not particularly material either to the architect or his client; but it becomes of real importance in the case of work abandoned at one stage or another and when the client is found to be contentious. An architect who brings into court various kinds of incomplete and ineffective material and offers them as "Preliminary Studies" and "Working Drawings" when suing for compensation under the Institute's schedule always reflects discredit on the profession. There is no doubt that the architect who gives his client full and efficient service can earn every cent he is entitled to receive under the new schedule, but he should take care that the evidences of this service may always be forthcoming.

A GOOD change has been the inclusion in the new schedule of a plain statement that the Institute is not a trade-union, but a professional body, and does not undertake to enforce the rates it recommends. Over and over again in the discussion we come upon such statements as these: "Each chapter should consider the schedule with respect to its own special conditions and increase the rates as the judgment of its members warrant;" "any variation from the schedule . . . may properly be left to individual members or chapters;" and particularly this: Mr. Barber:—"As I understand, the schedule simply covers minimum charges and each architect makes his own personal schedule," with the President's rejoinder from the chair: "Yes, and it may be higher or *lower*." This plain official pronouncement goes far to do away with the difficulty mentioned in the opening paragraph.

THERE is something pathetic about the situation of the promoters of the exposition at Jamestown, and we wish, since they are in such trouble, it might at least serve a useful purpose as a warning and put a final stop to these wasteful ventures that are foredoomed to failure. The Centennial Exhibition was vastly worth while, as it served to inform the country itself and the world at large that it had recovered from the effects of the Civil War, and was ready to make progress. The Chicago Fair, again, was well worth while to the country at large, unfortunate as it was for Chicago itself. The Louisiana Purchase Exposition alone was beneficial to the country, to the promoters and to the community where it was held; but this was due to the fact that for long years St. Louis had been, as it were, "sold short" in the matter of those municipal equipments and conveniences that go to the making of a metropolitan city. So the outlay that was made for the accommodation and handling of visitors provided merely so many needed utilities which a wealthy community could well afford to have. But elsewhere fairs have been anything but blessings to their promoters and the towns in which they were held.

Report of the Committee on Revision of Schedule of Charges, A. I. A.

THE reasons given in the resolution of the last convention creating a committee to consider the remuneration of the architect, are that conditions have changed greatly in the profession of architecture in recent years; that the burden and expense of the architect's work have increased enormously, and that the basis of his remuneration has remained practically unchanged since the foundation of the Institute.

That conditions have changed in architectural practice needs probably no amplification, but it may be well to note how much greater demands, both artistic and constructive, are made upon the practitioner of the present day. The preliminary training of the architect requires many years of arduous application. The service which the architect is called upon to render is many times more varied and burdensome than formerly, by reason of the wider prevalence of artistic comprehension and consequent demand on the part of the public, and by reason of new methods of construction, new materials, new sanitary and mechanical equipment. The problems, however, which the architect is called upon to solve, from conception to execution, are infinitely more vast and complex than ever before. It can readily be seen that these conditions make necessary more elaborate, minute and concise drawings and specifications, closer and more constant supervision. Office forces have had to be increased, sub-divided into departments, organized and systematized, for which trained assistants commanding high salaries are required, not only for the principal but for the minor positions. With the advance in the cost of living, rentals have been raised as have the incidental items of office maintenance.

These statements are self-evident, but, on the other hand, the multitude of new requirements in modern building construction, the greater elaboration of design, the better methods of construction now generally adopted, the increased cost of building materials and the higher wages paid to workmen in all the trades, have increased the total cost of building operations. As it is on this total that the architect's remuneration is based, his gross earnings are greater, but the point to be considered is whether they are commensurate with the increased service demanded.

In order to arrive at a general expression on this point the Committee addressed a series of questions to each Chapter of the Institute. These questions bore upon the net average compensation of the architect, upon the application of the minimum rates as defined in the present schedule to all classes of work in its community, upon other possible systems of charging than the percentage in common use, upon the ability of practitioners to secure the minimum rates of the schedule, upon charges for expert services and other matters which can best be presented by a summation of the answers received.

As indicating the widespread interest in the subject, answers more or less complete were received from twenty-two of the twenty-eight Chapters. The six Chapters from which answers have not been received are Indianapolis, Central New York, Buffalo, Colorado, Washington State and Dayton. The membership of some of these is widely scattered and any combined expression of opinion difficult to secure. Parallel conditions exist, however, in other Chapters, so that the information received covers fairly the entire country.

Three classes of opinions exist regarding the sufficiency of the present minimum charges. In many of the largest cities, especially in New York City, the minimum rates are stated as too low. In many of cities of the intermediate class the minimum rates are sufficient for all work except residences. In the smaller towns and in the South the minimum rates are considered sufficient for all classes of work, in many instances difficulty being experienced in securing them.

An opinion frequently expressed in the answers is that for large operations of the simpler sort, such as warehouses, manufacturing buildings and other buildings approximating these in character, the net return is sufficient to warrant a rate less than the minimum specified.

With the exception of New York and Cleveland, which recommend a rate of 6 per cent., and of San Francisco, which would place charges on a [illegible] per cent. basis, all the Chapters are satisfied with the present 5 per cent. rate except for residential work. An increase on residential work is very generally conceded as imperative. The rates proposed vary from 6 per cent. to 7½ per cent. flat; or a sliding-scale beginning with 10 per cent. on the first $10,000 of cost and averaging in one instance as high as 8 per cent. on an operation of the value of $100,000.

The report of the New York Chapter in respect to this item stands alone in that it proposes, *First*, that there shall be two principal groups, City Work and Suburban Work, each of which shall be sub-divided into seven classes, (*a*) Domestic, (*b*) Commercial, (*c*) Public and Semi-Public, (*d*) Monumental, (*e*) Landscape Work, (*f*) Special Interior Work, Decorative Work, Furniture and Fixtures, (*g*) Work involving alterations and additions to existing work; and, *Second*, that the client shall have the option of employing the architect on a percentage basis, or on the basis of an honorarium plus expenses. The report fixes percentages for every class of work on both bases of charging. It is of so great interest and shows so much thought, that it is appended in full below. All the questions asked by the Committee (the same submitted to all the Chapters) are stated verbatim in the report, together with the answers of the New York Chapter.

With respect to the possibility of securing increased rates, while nearly all Chapters reply in the negative in so far as general work is concerned, all but six (Kansas City, Atlanta, Iowa, Connecticut, St. Louis, Cincinnati) report that an increase could be secured on residential work.

There is practically no endorsement of the suggestion that the parts of a building to which, in the ordinary application of the schedule, the 5 per cent. rate should apply, be reduced so as to comprise, for instance, the shell merely, and a higher rate, say 10 per cent., be charged on everything else. Opinion would approve rather a definite average increase in the rate.

The substitution in place of the present schedule, of a system based on the actual cost of production to the architect, plus an honorarium, has not met with general favor among the Chapters, largely, we think, because it has been so little tried. Where it has been tried the success has varied greatly, so that your Committee feels that it cannot recommend the method for adoption into the Institute schedule. A resolution of the Executive Committee of the New York Chapter, which accompanies the report of that Chapter, expresses the same view. It would seem that further inquiry into the subject, with a detailed record of actual experience, might be profitable. There can be no doubt that in some cases the system is distinctly to the client's advantage, improves the conditions under which the architect works and at the same time gives the architect a reasonable fee; but on the other hand, there is a supervision of the expenses and management of the architect's practice by the client which might easily hamper the best efforts of the architect, detract from the best service to the client, and multiply chances of dispute.

The adoption of an increased schedule by the Institute would, in the opinion of most of the Chapters, be helpful in securing higher rates, but the increase would have to be a reasonable one, and in some localities it would take a considerable time to establish. Other Chapters believe the Institute's formal action in this respect would be without effect.

Replies as to the question whether the members of the various Chapters live up to the present schedule, were either on the one hand most reassuring or on the other most disappointing. In some instances the rates received fall so far below what would seem to be not only a fair compensation but the actual cost of producing good work, that one is forced to ask how it is possible to carry on practice under such conditions. The reasons alleged are competition and underbidding. The state of professional practice in such communities is deplorably low and it is earnestly hoped that the profession in more enlightened communities, which means the greater part of the territory covered by the Institute, should be strongly interested in the determination of equal and proper charges.

The practice of charging for expert services scarcely exists except in the larger cities of the East. In fact, experts seem to be rarely employed elsewhere. There is no doubt about the

need and value of experts' services, as the client is greatly benefited thereby, to the economy of construction and operation. The architects' duties are not diminished by the employment of an expert—in some cases they are increased; the architect is therefore entitled to his usual compensation in addition to the expert's fee.

In attempting a revision of the Schedule of Charges, several important facts must be borne in mind.

The existing schedule, irrespective of its merits, has after many struggles been established as an accepted ***minimum*** rate of professional charges. While the United States Government has only so accepted it in the last few years, it has been cited in the courts for a much longer time.

The existing schedule is clear, concise, businesslike and expressed in good English.

Any schedule adopted by the Institute as its formal pronouncement must be applicable, as far as possible, to the entire country; it must at least not depart far from a fair average rate of remuneration.

Any changes in the schedule should be well considered, absolutely reasonable and defensible, and should above all not interfere in any way with its value as a business and legal document. Great care should be exercised to maintain it as the expression of a professional body in contrast to that of a trades union.

Your Committee, in endeavoring to bear these facts in mind, makes later recommendations, but would ask attention beforehand, to the following suggestions, which have grown out of its investigations, but which it deems inexpedient to incorporate in the formal schedule.

First—In some instances and in some localities, the minimum rates proposed are not remunerative. It should therefore be proper that each Chapter consider the schedule with respect to its own special conditions and increase the minimum rates as the judgment of its members warrants.

Individual practitioners who, by reason of large experience or unusual ability or volume of work or from whatever cause, have achieved a leading position in the profession, have a right to receive, and should demand as a duty to the profession, a higher remuneration than those less distinguished.

Second—The sub-division of the schedule into various rates for various classes of work, as described in the letter of the New York Chapter, is a condition which may become imperative in the course of time, as it has in Germany, for instance, where the schedule of the Union of Architects' and Engineers' Societies is much more sub-divided than that proposed by the New York Chapter.

Third—The system based upon the client's paying all the expenses of production, plus a fixed sum, in compensation of the architect, equivalent to the profit which the architect would realize in carrying out the work in the usual way, is to be recommended where it will improve the character of the work or where, while not detracting from the character of the work, it will be to the owner's pecuniary advantage.

Fourth—It seems inadvisable to state that mills, factories, warehouses and other simple buildings of a similar nature may be executed at less than the minimum rate mentioned in the schedule, as that is not invariably true and some individual freedom must be allowed in such instances.

Fifth—Where, in the execution of work, the architect lets the various parts to more than one contractor, he is entitled to compensation for such services in addition to the usual charges for the professional services enumerated in the schedule.

The changes which the Committee recommends for adoption affect the first four paragraphs of the schedule, and consist:

First—In separating residential work from the general group and increasing the rate to 10 per cent. on the first $20,000 of cost, 8 per cent. on the second $10,000, and 6 per cent. upon the remainder of cost in excess of $30,000. Thus, on a residence costing $30,000, the charge is 9 1-3 per cent.; costing $50,000, 8 per cent.; costing $100,000, 7 per cent.

Second—In fixing the minimum charge on *all* new works costing less than $10,000 at 10 per cent., and further in stating that such a charge, together with the 10 per cent. stated as minimum for landscape architecture, furniture, monuments, decorative and cabinet work, is in many instances not remunerative, and it is usual and proper to charge a special fee in excess thereof.

The revisions are here set down in detail in a column parallel with the present paragraphs they are intended to replace. The remainder of the paper is unchanged.

PROFESSIONAL PRACTICE OF ARCHITECTS AND SCHEDULE OF USUAL AND PROPER MINIMUM CHARGES.

Present Reading.	Proposed Substitutions.
The architect's professional services consist in making the necessary preliminary studies, working - drawings, specifications, large-scale and full-sized details, and in the general direction and supervision of the work, for which the minimum charge is 5 per cent. upon the cost of the work.	The architect's professional services consist of the necessary preliminary conferences and studies, working-drawings, specifications, large-scale and full-size details, and in the general direction and supervision of the work, for which, except as hereinafter mentioned, the minimum charge is 5 per cent. upon the total cost of the works executed under his direction.
For new buildings costing less than $10,000, and for furniture, monuments, decorative and cabinet work, it is usual and proper to charge a special fee in excess of the above.	For residential work the minimum charge, except as hereinafter mentioned, is 10 per cent. upon the first $20,000 of cost, 8 per cent. upon the next $10,000, and 6 per cent. upon the remainder of cost in excess of $30,000.
For alterations and additions to existing buildings, the fee is 10 per cent. upon the cost of the work.	For all new works other than residential, costing less than $10,000, for alterations and additions to existing buildings, for landscape architecture, and for furniture, monuments, decorative and cabinet work, the minimum charge is 10 per cent. In many instances 10 per cent. is not remunerative and it is usual and proper to charge a special fee in excess thereof.
Consultation fees for professional advice are to be paid in proportion to the importance of the questions involved.	Consultation fees for professional advice are to be paid in proportion to the importancce of the questions involved and services rendered.

None of the charges above enumerated covers alterations and additions to contracts, drawings and specifications, nor professional or legal services incidental to negotiations for site, disputed party-walls, right of light, measurement of work, or failure of contractors. When such services become necessary, they shall be charged for according to the time and trouble involved.

Where heating, ventilating, mechanical, electrical and sanitary problems in a building are of such a nature as to require the assistance of a specialist, the owner is to pay for such assistance. Chemical and mechanical tests, when required, shall be paid for by the owner.

Necessary traveling expenses are to be paid by the owner.

Drawings and specifications, as instruments of service, are the property of the architect.

The architect's payments are due as his work progresses in the following order: Upon completion of the preliminary sketches, one-fifth of the entire fee; upon completion of working-drawings and specifications, two-fifths; the remaining two-fifths being due from time to time in proportion to the amount of work done by the architect in his office and at the building.

Until an actual estimate is received, the charges are based upon the proposed cost of the work, and payments are received as installments of the entire fee, which is based upon the actual cost to the owner of the building or other work, when completed, including all fixtures necessary to render it fit for occupation. The architect is entitled to extra compensation for furniture or other articles purchased under his direction.

If any material or work used in the construction of the building be already upon the ground or come into the owner's possession without expense to him, its value is to be added to the sum actually expended upon the building before the architect's commission is computed.

In case of the abandonment or suspension of the work, the basis of settlement is as follows: Preliminary studies, a fee in accordance with the character and magnitude of the work; preliminary studies, working-drawings and specifications, three-fifths of the fee for complete services.

The supervision of an architect (as distinguished from the continuous personal superintendence which may be secured by the employment of a clerk of the works) means such inspection by the architect, or his deputy, of work in studios and shops, or of a building or other work in process of erection, completion or alteration, as he finds necessary to ascertain whether it is being executed in conformity with his drawings and specifications or directions. He is to act in constructive emergencies, to order necessary changes and to define the true intent and meaning of the drawings and specifications, and he has authority to stop the progress of the work and order its removal when not in accordance with them.

On buildings where the constant services of a superintendent are required, a clerk of the works shall be employed by the architect at the owner's expense.

Respectfully submitted,

Edgar V. Seeler, *Chairman.*
Wm. Rutherford Mead.
John M. Carrère.
John Lawrence Mauran.

Chicago, November 18, 1907.

APPENDIX.

REPLIES OF THE NEW YORK CHAPTER, A. I. A., TO THE QUESTIONS OF THE COMMITTEE.

1. Do you agree that the present minimum rates as defined in the Institute Schedule of Charges are too low to properly compensate the architect, after deducting fair normal expenses for production? *Ans.*—Yes.

2. (A) Do you think that the present Schedule should apply to all classes of work indiscriminately (i. e., city and suburban, monumental and commercial)? *Ans.*—No.

(B) If you think the rates should be different for different classes of work, state the classification and rates you would propose. *Ans.*—

SUGGESTED CLASSIFICATION.

1. CITY WORK.
- (A) Domestic.
- (B) Commercial.
- (C) Public and semi-public.
- (D) Monumental.
- (E) Landscape work.
- (F) Special interior work, decorative work, furniture and fixtures.
- (G) Work involving alterations or additions to existing work.

2. COUNTRY WORK.
- (A) Domestic.
- (B) Commercial.
- (C) Public and semi-public.
- (D) Monumental.
- (E) Landscape work.
- (F) Special interior work, decorative work, furniture and fixtures.
- (G) Work involving alterations or additions to existing work.

3. (A) Referring to the district covered by your Chapter, do you think the present rate can be increased? *Ans.*—Yes.

(B) If so, how and to what extent? *Ans.*—Not less than 30 per cent.

4. Do you think it would be advisable, retaining the present charges of 5 per cent. on the constructive parts of the building and 10 per cent. on the decorative, to reduce the items to which the 5 per cent. rate would apply and increase those to which the 10 per cent. rate would apply? If so, where would you draw the line? *Ans.*—If the present method of charges should be adhered to, we would then suggest 5 per cent. on shell, 10 per cent. on everything else, including plumbing, heating, lighting and ventilation.

5. (A) Do you believe a different system of charging (already in use with some architects or attempted) based on the cost to the architect, plus an honorarium or percentage, would be generally practicable? *Ans.*—Yes, decidedly so.

(B) Give reasons for and against. If approved, state details of operation. *Ans.*—Reasons are obvious; the operation a matter for discussion.

6. (A) Has any member of your Chapter given the system mentioned in question No. 5 a trial? *Ans.*—Yes.

(B) If possible to secure a statement of his experiences and opinion, include it with these replies. *Ans.*—Not practical to obtain it, as the experiment is too recent, but so far has been very satisfactory.

7. Would the adoption of an increased schedule by the Institute help you to secure higher percentages? *Ans.*—Yes.

8. What percentage of your members lives up to the present schedule? *Ans.*—Practically all.

9. If any do not, what reasons can be given for not so doing? *Ans.*—Special work in special cases.

10. (A) Is the practice of charging for experts' services, in addition to the regular charge, common and usual among the members of your Chapter? *Ans.*—Yes.

(B) If so, to what kind of expert services does it apply? *Ans.*—Heating, lighting, plumbing, ventilation and special topographical and mechanical engineering problems.

11. Have you other suggestions to make respecting the schedule of charges, whether referring to the points mentioned or otherwise? *Ans.*—Would suggest the adoption of a new schedule making it optional with the client to employ the architect on the present basis of a commission or on the basis of an honorarium plus expenses. In the first case we believe that the work should be classified and that the commission should vary with different classes of work and in all instances should be progressive and should be made higher than the present rates. In case of a charge based on expenses plus honorarium, the honorarium should be calculated by adding to the cost of the draftsmen's salaries a percentage for office expenses sufficient to include the salaries of clerks, stenographers and others whose services are general in character and also to cover expenses for absences due to illness, vacations, etc.

We believe that the charge for expenses should be equal to 50 per cent of the item of salaries; that is to say, that the total expenses should be equal to the salaries, plus 50 per cent. As to the honorarium, the following table covers both systems:

CITY WORK.

	Previous Method.	New Method.
Class A (Domestic)—		
	On shell—7 per cent. on 1st $100,000.	3 per cent.
	6 per cent. on 2d $100,000.	
	5 per cent. on balance of cost.	
	On all other parts of work—10 per cent.	5 per cent.
Class B and C (Commercial, Public and Semi-Public)—		
	On shell—6 per cent. on 1st $100,000.	3 per cent.
	5 per cent. on balance of work.	
Class D and E (Monumental and Landscape Work)—		
	10 per cent.	6 per cent.
Class F (Special Interior Work, Decorative Work, Etc.)—		
	10 per cent.	6 per cent.
Class G (Work Involving Alterations, Etc.)—		
	10 per cent.	6 per cent.

COUNTRY WORK.

	Previous Method.	New Method.
Class A (Domestic)—		
	On shell—10 per cent. on 1st $50,000.	4 per cent.
	6 per cent. on balance of cost.	
	On all other parts of work—10 per cent.	6 per cent.
Class B and C (Commercial, Public and Semi-Public)— (Same as city.)		
	On shell—6 per cent. on 1st $100,000.	3 per cent.
	5 per cent. on balance of work.	
Class D and E (Monumental and Landscape Work)—		
	10 per cent.	6 per cent.
Class F (Special Interior Work, Decorative Work, Etc.)—		
	10 per cent.	6 per cent.
Class G (Work Involving Alterations, Etc.)—		
	For work under $50,000, 15 per cent.	8 per cent.
	For work over $50,000, 10 per cent.	6 per cent.

RESOLUTION PASSED BY THE EXECUTIVE COMMITTEE OF THE NEW YORK CHAPTER, JUNE 20, 1907.

RESOLVED, That while the Executive Committee of the New York Chapter thinks the plan of an honorarium plus cost in lieu of a percentage charge would be a desirable one in certain cases and that any architect should be permitted to use it if he thinks wise (provided that such honorarium be not less than one-half of the present schedule rates), it is opposed to the incorporation of this method of charge in the schedule approved by the Institute, for the reason that it would weaken our schedule as a recognized standard of practice.

MINORITY SUBSTITUTE FOR RATES PROPOSED IN THE MAJORITY REPORT OF THE COMMITTEE ON REVISION OF SCHEDULE OF CHARGES.

Strike out paragraphs 2 and 3 of the schedule proposed in the report and in place thereof substitute the following:

For residential work the minimum charge, except as hereinafter mentioned, is 7 per cent. upon the first $20,000 of cost and 6 per cent. upon the remainder of cost in excess of $20,000.

For residential work costing less than $10,000, 7 per cent. is in many instances not remunerative, and it is usual and proper to charge a special fee in excess thereof.

For all new works, other than residential, costing less than

$10,000, except as hereinafter mentioned, the minimum charge is 7 per cent.

For alterations and additions to existing buildings it is usual and proper to charge special rates in excess of those mentioned above for new buildings of the same character and cost.

For landscape architecture and for furniture, monuments, decorative and cabinet work, the minimum charge is 10 per cent. In many instances 10 per cent. is not remunerative, and it is usual and proper to charge a special fee in excess thereof.

W. C. NOLAND.

PROFESSIONAL PRACTICE OF ARCHITECTS AND SCHEDULE OF USUAL AND PROPER MINIMUM CHARGES.

Present Reading.	Proposed Substitutions.
The architects' professional services consist in making the necessary preliminary studies, working drawings, specifications, large scale and full size details, and in the general direction and supervision of the work, for which the minimum charge is five per cent. upon the cost of the work.	The architect's professional services consist of the necessary preliminary conferences and studies, working drawings, specifications, large scale and full size details, and in the general direction and supervision of the work, for which, except as hereinafter mentioned, the minimum charge is five per cent. upon the total cost of the works executed under his direction.
For new buildings, costing less than ten thousand dollars, and for furniture, monuments, decorative and cabinet work, it is usual and proper to charge a special fee in excess of the above.	
For alterations and additions to existing buildings, the fee is ten per cent. upon the cost of the work.	
Consultation fees for professional advice are to be paid in proportion to the importance of the questions involved.	Consultation fees for professional advice are to be paid in proportion to the importance of the questions involved and services rendered.
	Where the same set of drawings and specifications is used for more than one building erected at one time under one contract, the usual charge is made for the first building, and a modified charge for the repetition; but this basis of charge does not apply to recurrent parts in a single building, for which the full commission is charged on the total cost.
	[Balance of Schedule as at present.]

PROPOSED REVISION OF THE SCHEDULE OF PRACTICE AND CHARGES AS PRINTED AND SUBMITTED BY THE INSTITUTE'S COMMITTEE.

1. Substitute for the first three paragraphs of the [special] committee's printed revision the following:

A.—The American Institute of Architects as a professional body, recognizing that the value of an architect's services varies with his experience, ability and the locality and character of the work upon which he is employed, does not establish a rate of compensation binding upon its members, but it is the deliberate judgment of the Institute that for full professional services adequately rendered an architect should receive, as reasonable remuneration therefor, at least the compensation mentioned in the following schedule of charges, and that any variation from the schedule corresponding to a difference in quality and amount of the service rendered may properly be left to individual members or Chapters of the Institute.

B.—The architect's professional services consist of the necessary preliminary conference and studies, working drawings, specifications, large-scale and full-size detail drawings, and in the general direction and supervision of the work, for which, except as hereinafter mentioned, the minimum charge, based upon the total cost of the work to the owner, is as follows:

C.—On the first $10,000 of cost, or any part thereof, 10 per cent; on the second $10,000 of cost, or any part thereof, 7 per cent.; on the next $30,000 of cost, or any part thereof, 6 per cent.; on any balance of cost, 5 per cent.

D.—For landscape architecture and for furniture, monuments, decorative and cabinet work, the minimum charge is 10 per cent.; in many instances this is not remunerative and it is usual and proper to charge a special fee in excess thereof.

2. Substitute the word "studies" for "sketches" in the third paragraph on second page, so as to make it correspond in wording with paragraph "B" of the present revision.

3. Insert the word "general" in next to last paragraph of second page, so as to read as follows: "As he finds necessary to ascertain whether it is being executed in general conformity with his drawings and specifications or directions."

Where an operation is conducted under more than one contract the above schedule is to be applied to each contract as a separate transaction.

DISCUSSION.

PRESIDENT DAY: "We will now hear from Mr. Atterbury's committee."

MR. GROSVENOR ATTERBURY: "Mr. Chairman and gentlemen, I would say that we have not had time to prepare a written report, but we have spent nearly twenty-four hours in the consideration of the very admirable report of the special committee on the Revision of Schedule of Charges. There is so much in that report to comment on that it is necessary to contemplate the result of it and consider its suggestions, most of which this committee approve. We have considered both the majority and the minority reports on this matter, and with respect to the two principal recommendations which that majority report contains, I would comment as follows: The first one which raises by about 100 per cent. the minimum commission on domestic work and which leaves at the old schedule of 5 per cent. the commission on other work seems to your committee to bear unevenly and unfairly on the make-up of the profession in that it makes it increasingly difficult for the small but none the less honorable practitioners to obtain the schedule rates on his work. Some of the committee felt very strongly that if the rate of commission on work, which on the average would perhaps run somewhere between $20,000 and $40,000 or even lower than that, was to be nearly doubled that it would be only fair to ask the bigger, the more successful, the better equipped man to make a somewhat corresponding increase in his rate of charges on other work of a larger character. Therefore, your committee has thought it wise to readjust the increase in what it considers to be a little fairer and more equitable form. The point was raised in this connection, moreover, that any increase in the rate applying to what we might call minor practice, would aggravate a situation which we ought not shut our eyes to as existing to-day, in that it is very difficult in many localities for the most honorably-minded and efficient architects to obtain even a 5 per cent. commission on small work and that they are, as our present schedule reads, under the necessity of doing what may seem to them, I understand, and does seem to many of us, an unprofessional thing in accepting work at a rate below that printed in the avowed schedule of the Institute of Architects. To avoid this increased and aggravated burden on the small practitioner—and by saying that I do not mean the poor practitioner—your committee has not only tried to equalize the increase, but it has thought wise to suggest that the time has come when the American Institute of Architects should take a somewhat radical step with relation to this matter and state frankly and honestly that it is a professional body; that it has none of the restrictive principles of a trades union, and that therefore it does not promulgate a hard-and-fast schedule of charges which shall be binding on all its members. In regard to the rate of increase, we feel that your [special] committee has recommended a rise too great to be made at one step, believing, as we do, that the rate of compensation which we architects will obtain in any event, is not determined by what is printed upon our schedule, but, first, by the value of the services which our members are able to render; and, second, by the demand of the public, the appreciation of the public of their value. In other words, that we

cannot at once put our schedule of compensation on a very much higher basis, and that we must go a little slowly, until such time as the people are ready to ask for the kind of service that we believe our profession should render.

"Therefore we have not made the increase as radical as the [special] committee recommended. In order, furthermore, to simplify the schedule, and in view of the fact that your committee believed that with the proposed preamble the individual practitioner is left free to vary in accordance with the conditions, his charges, that it is unnecessary to differentiate into very many sections the classes of work to be covered by our schedule. I will read you the proposed revision of the schedule of practice and charges as printed by the special committee, and of which I have had a few copies typewritten. Unfortunately, we have not had time to have as many of these copies made as I wish we had. · There will be a few so that the members of the convention can criticise them. This matter is not in very good form, and I shall have to ask you to make one or two changes. I will read 1, and I will read A and B. On the second page of the special committee's report, third paragraph, there is a slight verbal change, substituting the word 'studies' for the word 'sketches' so as to make it correspond with the word used in the first paragraph both in the special committee's report and the present revision.

"Third, the insertion of the word 'general' in the third paragraph, so as to make it read as follows, this referring to the matter of superintendence and being intended to so qualify the superintendence as to make it not a quaranty to relieve the architect of what now appears to your committee to be the position of an insurance company, if he regards the technical wording of the schedule as binding. In other words, so that it shall read: 'As he finds necessary to ascertain whether it is being executed in general conformity with his drawings and specifications or directions.' It is scarcely necessary, gentlemen, for me to say much with respect to this suggested revision. It is, of course, primarily for the Convention to discuss. I would say one or two things, however, briefly, which in the course of our discussion have weighed with us in making this recommendation. The objection to our first clause, with regard to the Institute's position as to compensation, has been made that it let down the bars and that it might lead to very unprofessional practice, and our answer to that was that the schedule of charges was not the place to control professional relations as between the members of the Institute, and that such relations were not determined primarily in dollars and cents. Secondly, with relation to the clause at the bottom of paragraph three in this revision, reading as a note to the effect, "Where an operation is conducted under more than one contract the above schedule is to be applied to each contract as a separate transaction.' I would say that was written to answer the demand of a great many of the profession that there be some provision made for additional compensation to the architect for letting and manipulating the work under separate contracts, without the employment of the so-called general contractor. The clause which we had submitted to us to that effect appeared to us to be perhaps a little dangerous, and we thought that this particular clause would automatically govern that situation without raising any question as to the matter of general or sub-contract work. The special committee, who submitted to you the printed revision, has accepted the report and proposed changes which I have read to you, and on behalf of the Convention Committee I wish to offer a resolution to the effect that the Convention Committee's report as read be referred back to the special committee on Schedule of Charges, with instructions that it be edited by them and printed, as representing the voice of this Convention."

MR. SEELER: "Mr. Chairman, the general committee appointed to go over the schedule of charges and suggest revision feels very much gratified indeed that the result of its labors has been not only received with so much consideration, but that the Convention Committee has deemed wise to go into it in so much detail. We are glad to see that some of the recommendations, which we did not feel competent to recommend for adoption into the printed schedule, believing that, perhaps, they were in advance of the time, have nevertheless been accepted and presented to you for adoption in a form which meets entirely with our acceptance. The criticisms which the committee, of which Mr. Atterbury is chairman, have made, are most reasonable. Representing our committee, I have been in conference with Mr. Atterbury and his committee and have had some hand in framing the paragraphs which they propose. I believe I speak with full authority from the other members of my committee in saying that we endorse in all respects the essential ideas of Mr. Atterbury's committee."

MR. BERGH: "Under section 6, where it states, 'For the first $10,000,' and so on, are we to understand that when an operation comes in that we know costs $100,000 or more, that the first terms prevail, or is it one amount of 5 per cent.? In other words, it would make a difference of $1,000 on the commission, and it would seem to me too small in a large operation to charge the client 10 per cent. for the first $10,000."

MR. SEELER: "The preamble to the schedule as proposed, in its latest form, it seems to me, makes that clear. I brought that up in the meeting of Mr. Atterbury's committee. An operation of, say, $500,000, is of such importance that I personally could not say to my client that on the first $10,000 of such an operation my charge would be 10 per cent. I do not feel that I am bound to do so by this schedule, and I surely would not do it."

MR. DONN BARBER: As I understand, the schedule simply covers the minimum charges and each architect makes his own schedule a personal schedule.

THE PRESIDENT: Yes, and it may be higher or lower.

MR. NOLAND: I would like to say, as to the work of the committee that revised the report of the Committee on Schedule, as a minority member who stood for the lower charges, I am glad that they settled it in a very happy way, in their opening clause, which states that this thing is not binding absolutely as to figures, but states what is usual and proper, and leaves it to the individual as to the character of work that he furnishes, the individuals and the chapters. There is one point in which I think the schedule could be improved. That is, I think there should be a pronouncement to show to the public that the architects themselves have found, by their experience, that there is a great deal more work required to produce a residence than any other building, or a general run of buildings involving the same amount, on which they base their charges. Therefore I would like to propose that a clause be put in which could follow right along after the rates given.

PRESIDENT DAY: Before "D," you mean?

MR. NOLAND: Yes, before "D"—"as residential work usually requires a greater amount of service." I move the adoption of this addition.

MR. SEELER: It seems to me that latitude is given to every individual practitioner. The impression prevailed in the committee to which this report was referred that the rates there mentioned simply followed the entire schedule allowed of increase in rates on residential work where they were necessary. In certain districts of the country it is quite likely that the increased rate mentioned in the schedule as proposed cannot be obtained. Therefore that statement, it seems to me, might be omitted.

MR. BENJ. S. HUBBELL: The committee considered that in detail and it was the committee's opinion, unanimously, that the more simple way in which we could send this schedule out the better. A man need not charge 10 per cent. on a $10,000 residence unless he wishes to do it. We felt that in getting this report we had improved upon the original committee's report, in that we did not differentiate between the classes of work. * * * Each individual can make a schedule as he sees fit. This committee has before them the schedules of a great number of architects, and we found that it was customary among the better, higher practitioners in the profession to charge 7 1-2 to 10 per cent. upon residential work, even though the schedule of the Institute says 5, and the committee wished to make it as simple as possible.

After discussion, the question on the amendment was put and carried and several other amendments were considered and adopted.

PRESIDENT DAY: Unless there are further amendments the question now is, Shall the Schedule of Charges be amended by adopting the work of Mr. Seeler's committee as now amended?

A standing vote was taken, which resulted as follows:

In favor of the adoption of the schedule, 69.

Against the adoption of the schedule, none.

MR. STONE: Now, I move that the work of to-day, in respect to the Schedule of Charges, be edited by the committee and printed.

Motion seconded and carried.

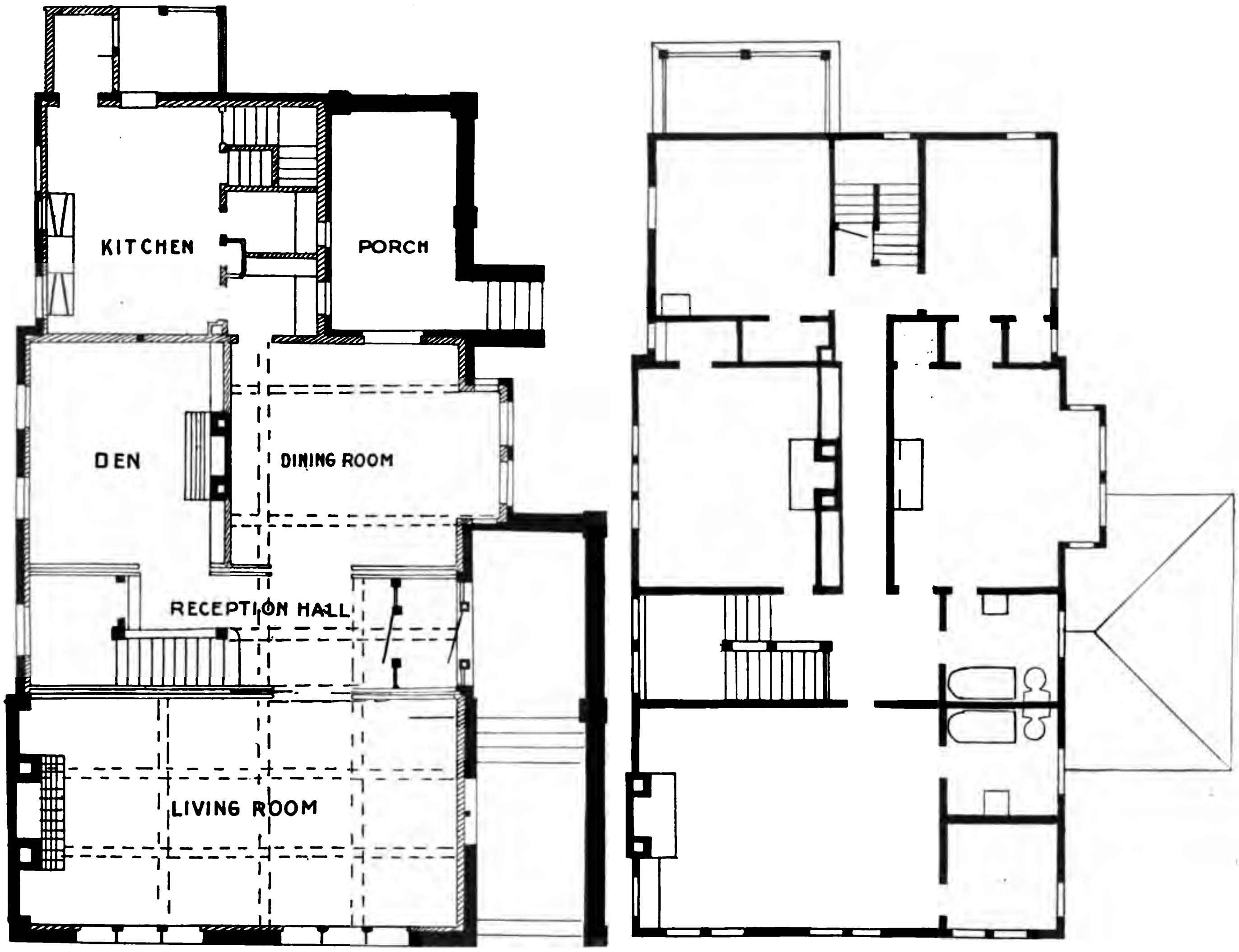
ILLUSTRATIONS

THE LOTUS CLUB BUILDING, NEW YORK, N. Y. MR. DONN BARBER ARCHITECT.

In designing this building, Mr. Barber has incorporated many of the best features of the English clubhouses, and has avoided entirely the tendency to magnificence and display which has been too commonly exhibited in American buildings of this character.

The two lower stories of the clubhouse are of limestone; above that the walls are of buff brick, while throughout the uppermost stories brick of varying colors with marble inlays—the whole producing a mosaic effect—will be used. An interesting feature in the basement is the large den and billiard-room, while on the main floor are the parlor, lounging and reception-rooms, offices and café. The ladies' dining-room is accessible by a separate entrance and will occupy the rear of the second floor, with a library, governors' room and private dining-rooms at the front. The third, fourth and fifth floors are given over to bed-rooms, of which there are 32. There are 19 bath-rooms on this floor. The kitchen and service departments will be on the fifth floor.

Probably no club in New York owns so large and valuable a collection of good paintings as the Lotus. These are not only gifts of the lay members (and the Lotus numbers among its members all the large collectors living in New York), but the many artist members have contributed the best examples of their work, so that it became necessary to provide a suitable gallery for the proper lighting and exhibition of this collection. This gallery is located on the seventh floor and forms a large T-shape room, 30 feet in height. This room, in part, will also be used as a club dining-room. The art gallery will be at the front end and extending across the full width of the building, which is 75 feet. This gallery is lighted through the roof. This floor can be converted into one large room to serve as a banqueting-room on special occasions and will have a seating capacity of 600. The decorative scheme throughout is low in tone and simple in character. The estimated cost of the building is $250,000.



HOUSE OF MR. BOYNTON, DETROIT, MICH. MR. E. W. GREGORY, ARCHITECT.

HOUSE OF DR. A. H. ELY, SOUTHAMPTON, LONG ISLAND, N. Y. MR. GROSVENOR ATTERBURY, ARCHITECT.

The house of Dr. A. H. Ely, at Southampton, L. I., is located on a plot containing about five acres, allowing space on the west for gardens, and the rear, or north, for a stable.

The building is of frame construction, supported on brick piers. The portion under the kitchen wing only is excavated for a cellar, containing the hot-air heating plant, coal bins and stores.

The main driveway runs through the building, the second floor being built over the driveway to form a porte-cochere, the portion to the right or east of the driveway containing on the

first floor the doctor's offices; to the left of the driveway are the main living-rooms.

The second story, which is built over the driveway and doctor's offices, contains six main bed-rooms, boudoir, two dressing-rooms, three bath-rooms, two servants' rooms and servants' bath. The third floor contains five servants' rooms, large play-room and trunk-rooms.

The main rooms on the first floor are finished in stained cypress, the second story in white paint.

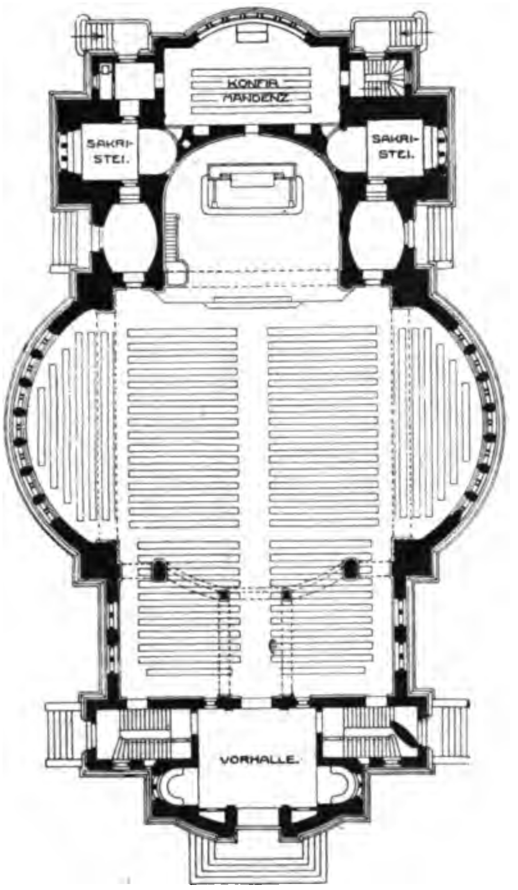
The exterior is finished in a buffish gray stucco on galvanized wire lath, up to a line of the second-story window sills, including the balconies with stucco brackets and perforated rails. The walls above the stucco and the entire roof are of shingles, every second course being laid double. The shingle walls are

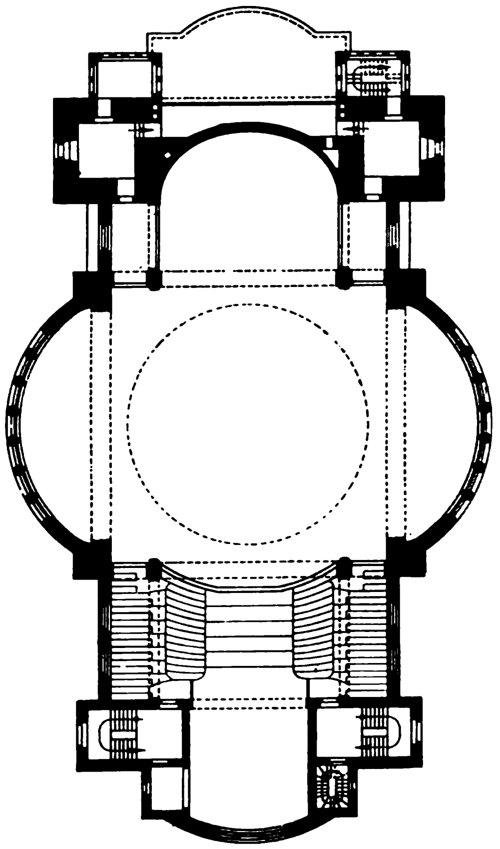
Additional Illustrations in the International Edition.

PROTESTANT CHURCH IN STREHLEN, NEAR DRESDEN, GERMANY. MESSRS. SCHILLING & GRÄBNER, ARCHITECTS.

Work on the building was begun in 1902 and completed in 1905.

A yellowish gray sandstone was used for the exterior; the roof is covered with red tile. The interior walls are plastered with lime mortar, the ceiling of the auditorium being of reinforced concrete. The pulpit and reading desk are of Untersberger marble. The total cost was $150,000. The building is considered the best piece of work so far completed by the architects, who are already well-known for their excellent designing of Protestant churches.





PROTESTANT CHURCH AT STREHLEN, GERMANY. MESSRS. SCHILLING & GRÄBNER, ARCHITECTS.

stained a light, soft green, and the roof a darker shade of the same color.

HOUSE OF MR. BOYNTON, DETROIT, MICH. MR. E. W. GREGORY, ARCHITECT.

The outer walls of the first story are built up of paving brick; the second story is of wood-frame construction, covered with cement plaster on wire-lath. The interior finish downstairs is oak with oak ceiling beams in the living-rooms, reception-hall and dining-room. The upper floor is finished a part in oak and partly in whitewood, with enamel finish. Plans of this house are shown on the preceding page.

In this case unlimited freedom was granted them in the preparation of their plans, and the construction was carried on under their supervision, without interference from any source. They were, therefore, enabled to develop their own ideas to the fullest extent, and with most gratifying results. The aim was to produce a structure which would differ materially from the Catholic churches and the Protestant edifices architecturally similar to them. The views show that they were eminently successful in attaining what they desired. Our illustrations, for which we are indebted to the *Blätter für Architektur und Kunsthandwerk*, give a general view of the church and a detail of the main entrance. We hope to show other views in a later number.

NOTES AND CLIPPINGS

NUMBER OF NEW YORK SKYSCRAPERS.—The Building Department recently made a census of high buildings on Manhattan Island. Including the unfinished tower of the Metropolitan Life Building, the tally revealed this:

Forty-eight-story building	1
Forty-one-story building	1
Twenty-six-story buildings	2
Twenty-five-story buildings	3
Twenty-three-story buildings	2
Twenty-two-story buildings	4
Twenty-story buildings	9
Nineteen-story buildings	2
Eighteen-story buildings	9
Seventeen-story buildings	2
Sixteen-story buildings	19
Fifteen-story buildings	19
Fourteen-story buildings	18
Thirteen-story buildings	13
Twelve-story buildings	169
Eleven-story buildings	101
Ten-story buildings	164
	538

The American Architect and Building News.

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AS the question of what is a proper fee for an expert-adviser to charge comes up in this country now and then, it is worth while to point out that two out of the three architects who are to act as judges on the competition for the London County Hall are each to be paid $5,250, the third member, the official architect to the County Council, having to render his service as coming in line with the duties for which he draws a satisfactory annual salary. As there are only twenty-three competitors in the final competition and therefore only the same number of solutions to consider, compensation in this case has been arranged on very liberal terms, far more generous, if memory serves, than was accorded to the judges in the Peace Palace competition, where there were more than seven times as many designs to confound the senses.

THE echo of that sinister word, "furnishings," seems to have traveled from Harrisburg, Pa., as far as to Des Moines, Ia., and, as a consequence, the Library Board of that city has decided that, since the new public library building is essentially finished save in the matter of decoration and furnishing, it can now dispense with the services of the architect, Mr. O. O. Smith, and save to the city the architect's five per cent. commission on such interior adornment. Naturally Mr. Smith resists this decision, and he should find abundant evidence near at hand to support his contention that a building is not finished until it is furnished and that his commission runs on the completed whole.

A MECHANIC without his tools is so barren a feature in the building world that a case recently decided in a New York court is of interest. In a general way a journeyman is expected to furnish his own kit of ordinary tools, while the employer provides the more expensive kinds or those only used occasionally; it therefore behooves the journeyman to care for and guard his tools, just as any other man takes care for his personal properties. But as there would be a good deal of useless labor in obliging mechanics to carry their tools daily to and from their jobs, to say nothing of inconvenience to other users of the vehicles of transportation who might find the close neighborhood of plaster-covered hoes and shovels and jagged saws discommoding, it has grown to be the practice for mechanics to leave their tools at their jobs in lockers provided by the contractors, the same being guarded, as a rule, by a night watchman. In spite of this, theft of portable tools is a common occurrence, and, as the loss that falls upon the bereft mechanic is a very real one, it is not surprising he should seek relief, and most naturally, through his union. Recently the Journeymen Carpenters' Union sought to establish by suit the principle that when a mechanic's tools were stolen the employer must replace them. The lower court rendered a verdict in favor of the union, but the Appellate Division has just reversed the decision and ordered a new trial, which is hardly likely to take place. But as the evil exists it should be remedied, and the natural remedy is insurance by some of the recognized indemnifying bodies, some of which, to a limited extent, already handle such business; but it is now done as an individual operation, whereas it should be done at a wholesale scale that would be worth the underwriters' attention. The proper relief seems to us to be for the several labor-unions to insure their members' tools; such a course would at least give a union-man the assurance that he was regularly benefiting in some degree by the fees paid in to his union.

CAPTAIN JOHN G. HASKELL, who died at Lawrence, Kan., late last month, in his seventy-eighth year, was a member of the firm of Haskell & Wood, which was for many years the leading architectural firm in the Southwest and naturally did a large amount of work, which, considering the fact that Mr. Haskell, though a graduate of Brown College, had not the advantages of an education in architecture such as young men now enjoy, was generally of a good type for its time. Among other public buildings erected for the State of his adop-

tion—he was a Massachusetts man by birth—were the State-house at Topeka, asylum buildings at Topeka and Osawatomie, buildings for the University of Kansas, Washburn College, the College of the Sisters of Bethany and a large number of school-houses, court-houses and other buildings in Kansas and the Indian Territory. Besides serving his country from beginning to the end of the Civil War, reaching the grade of captain, he served his State for a number of years as State Architect, to say nothing of serving as a member of the legislature.

BESIDES the death, at Baltimore, in his fifty-eighth year, of W. T. Wilson, junior member of the well-known firm of J. A. & W. T. Wilson, we must chronicle the death at St. Paul, Minn., of Louis H. Lockwood, who, though only forty-three years of age, had, through his practice of fourteen years in that city, won a well recognized position in the community as an architect of much ability, who was particularly strong in the success with which he gave a decorative value to his interior work. At the time of his sudden death, Mr. Lockwood was engaged upon, among others, buildings for the First National Bank and for the St. Paul Fire and Marine Insurance Company.

SO far as we can recall, we have never known of an American sojourning in Paris while in pursuit of an education in architecture who found it desirable to enroll in the École Spéciale d'Architecture, and we doubt whether most of those who owe fidelity to the École des Beaux-Arts ever heard of its younger sister. We believe that the École Spéciale may fairly be defined as one that devotes itself to the training of draughtsmen and superintendents or clerks-of-the-works rather than one undertaking to rival the great national school in preparing men to practice architecture as an art. It has given fruitful attention to the great middle ground between science and art, though leaning mainly towards the first, and has for many years now filled a most useful place in the general scheme of professional education. How far it has been recognized by and has received support from the Ministries of Public Instruction and the Fine Arts we do not quite know, but we do know that the good work has been carried on very largely by the founder, M. Émile Trélat, who died last month, in the eighty-sixth year of his age, after a life of activity that is worthy of consideration at some length.

WHILE yet a boy, he determined to become an engineer, but his father, noticing that the lad had unusual facility with brush and pencil, advised him to change his decision and go in for painting—just the reverse of the advice that is so often given to those born with a talent for drawing. The result of this suggestion was, however, quite as unusual; the boy at once dropped his drawing and devoted himself more strenuously than ever to the sciences and shortly after decided that he would enter the French navy through the regular naval school. At this point a friend of his father's, the astronomer Arago, intervened and persuaded young Trélat to enter the École Centrale, then quite a new institution. Here he finished the regular engineering course and, after graduation, devoted himself to ceramics and for a while sought to perfect all sorts of new and useful colored glazes, and some of his work is now held in high esteem by collectors. But this did not last long, for about this time Visconti engaged him to oversee work he was carrying out at the Château de Vaux-Praslin and then secured his assistance in the completion of the Louvre at that time going forward. In this way he was at last launched on an architectural career and shortly afterwards competed for and secured the position of architect of the Department of Seine-et-Marne, a post he filled for many years.

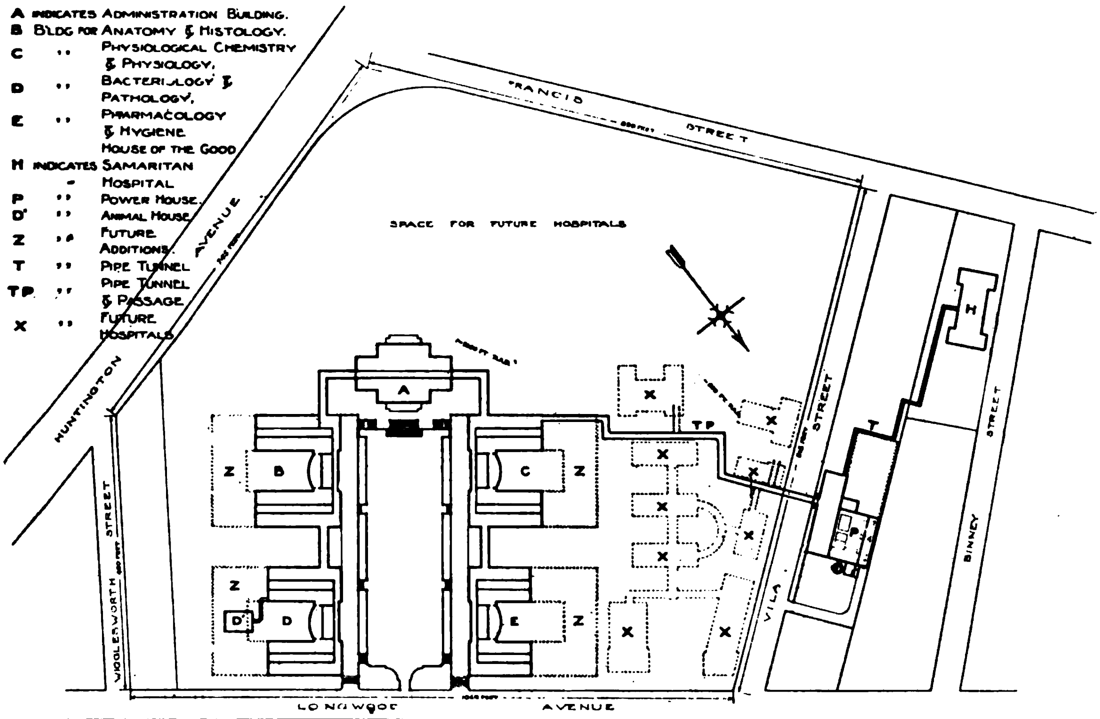
IN view of young Trélat's aspirations toward a naval career, it is quite in keeping that during the Franco-Prussian war he, although forty-nine years of age and so beyond the reach of conscription, should have served first as a captain of *mobiles* and later as the coadjutor of the Engineer-General Tripier. Long before this he was, as engineer-architect, charged with the erection of the buildings for the International Exposition of 1855, and about the same time he was made professor at the Conservatoire des Arts et Métiers, when he was given charge of the instruction in all that pertains to *constructions civiles.* It was due to the observations made while preparing and delivering his lectures at the Conservatoire that he perceived the need and opportunity for such a school as the École Spéciale, and he accordingly established it and devoted himself with ardor to its development, an ardor that never flagged, though it waned with advancing years. Although engaged in this way, he did not neglect other matters, and after the Commune he was appointed to the important post of Architect-in-Chief of the Department of the Seine, that is, practically, of Paris. This post he held for twenty years and resigned it only because the electors wished his services in the Chamber of Deputies, where they kept him until 1898, when he was over seventy-seven years of age.

ALTHOUGH perhaps no great architectural creation can be pointed out as the work of Émile Trélat, as, perhaps, not being a Beaux-Arts man, certain opportunities which are understood to be reserved for Prix de Rome men were denied him, it will be seen that his long career was not only useful and fruitful, but duly honored. The accomplishment upon which he most plumed himself was the foundation of the École Spéciale d'Architecture, and he was, we understand, deeply grieved at noting that, as the school was in a sense and to a considerable degree a one-man power affair, its fortunes seemed to dwindle with his own advancing years; but it is not possible to believe that, after a career of over half a century of usefulness, even so severe a blow as M. Trélat's death can be anything more than a temporary disadvantage to a useful educational institution.

The New Harvard Medical School Buildings, Boston, Mass.

FOR the elaborate memorial history of the Harvard Medical School published at the time the new buildings were dedicated early in 1906, the architects prepared the following description which we are allowed to reproduce in full:

In August of 1900 Drs. Henry P. Bowditch and J. Collins Warren called at the office of Shepley, Rutan & Coolidge, and informed them that they were authorized by the Corporation of Harvard College to consult with them and have sketch plans drawn for the Administration and Laboratory and Research Buildings which they considered necessary for a new Medical School; these buildings to embody the most modern methods of teaching and research work. They stated that through the kindness of certain gentlemen who were interested in the welfare of the University a piece of land formerly belonging to the Francis estate had been acquired. This lot of land is situated in Boston, and contains a little over twenty-six acres bounded by Francis Street, Huntington Avenue, Longwood Avenue, and extending beyond Vila Street in a westerly direction.



HARVARD UNIVERSITY MEDICAL SCHOOL,

BOSTON, MASS.

SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS.

SCALE OF 100 0 100 200 300 400 FEET

MECHANICAL PLANT. GENERAL PLAN.

FIGURE 1.

After many consultations it was decided that the highest portion of the land, which is at the junction of Huntington Avenue and Francis Street extending along the latter, should be reserved as a site for a general hospital, and that that portion towards the west, which was not needed for the Medical School buildings and their enlargement in the future, should also be reserved for hospital purposes.

The land where it was proposed to locate the Medical School falls about twelve feet from that reserved for the general hospital, so that the problem presented was quite difficult to solve, as one of the first requirements in the new buildings was to have communication between all the buildings by a corridor which should be level.

Several different schemes for the arrangement of the laboratories and Administration Building were drawn up, one being to place all the rooms which are now in five buildings in two high buildings. This scheme was very carefully considered and the advantages and disadvantages weighed against the plan finally adopted.

Although the two-building scheme is slightly cheaper in the original cost, yet it requires elevator-service for the students, which is not the case in the present buildings. It also prevented the laboratories and the instructors' rooms connected with them being segregated as they are in the present scheme.

Where microscopes are used, and a large number of students are to be in one room, it will readily be seen that the room must of necessity be much higher than an ordinary research-room where only one individual is at work, and to group these successfully in the scheme where only two large buildings were used was found to be a very much more difficult matter than in the present arrangement.

At the same time that these various ideas were being discussed, the heads of the different departments were being consulted in regard to the amount of space and arrangements in detail, and before either scheme was decided upon definitely each department had gone into all the details which were deemed necessary in the buildings to make them complete.

At this time Dr. Farrar Cobb was associated with the architects and was of great assistance in advising and in formulating and compiling the mass of information and requirements which had been obtained.

In most of the buildings which have been designed for our American universities sufficient attention has not been paid to the future and the possibility that, as the system of teaching may change, the building should be so designed and constructed that it can be adapted to these future ideas and needs. In both the schemes which were worked out the future growth of the buildings was considered and arranged for, in that the wings may be extended to a sufficient depth to form a court in which the light will penetrate to the rooms surrounding it and that these two wings may be connected together at the far end by an additional parallel with the front. Here again the plan adopted shows its superiority over that of a high building, as the light on the entrance floor in the latter is impeded by the height of the wings.

As soon as the general form and arrangement of the buildings were decided upon, sketch plans and sketches were prepared and pen-and-ink drawings, from which reproductions were made and given to Dr. Bowditch and Dr. Warren, and to their untiring efforts the completion of the new Medical School buildings is due.

While this was going on drawings were made in detail and turned over to the heads of the departments for their criticism and revision, and changes were made until each one had expressed himself as satisfied, after which a complete set of working-drawings were made which were gone over very carefully by President Eliot and Drs. Walcott and Cabot, who represented the Corporation. These were approved by them, and bids were taken.

Before the contract was signed, the Norcross Bros. Co. offered to substitute marble from their quarries in Dorset, Vt., without change from the contract price, and this was accepted by the

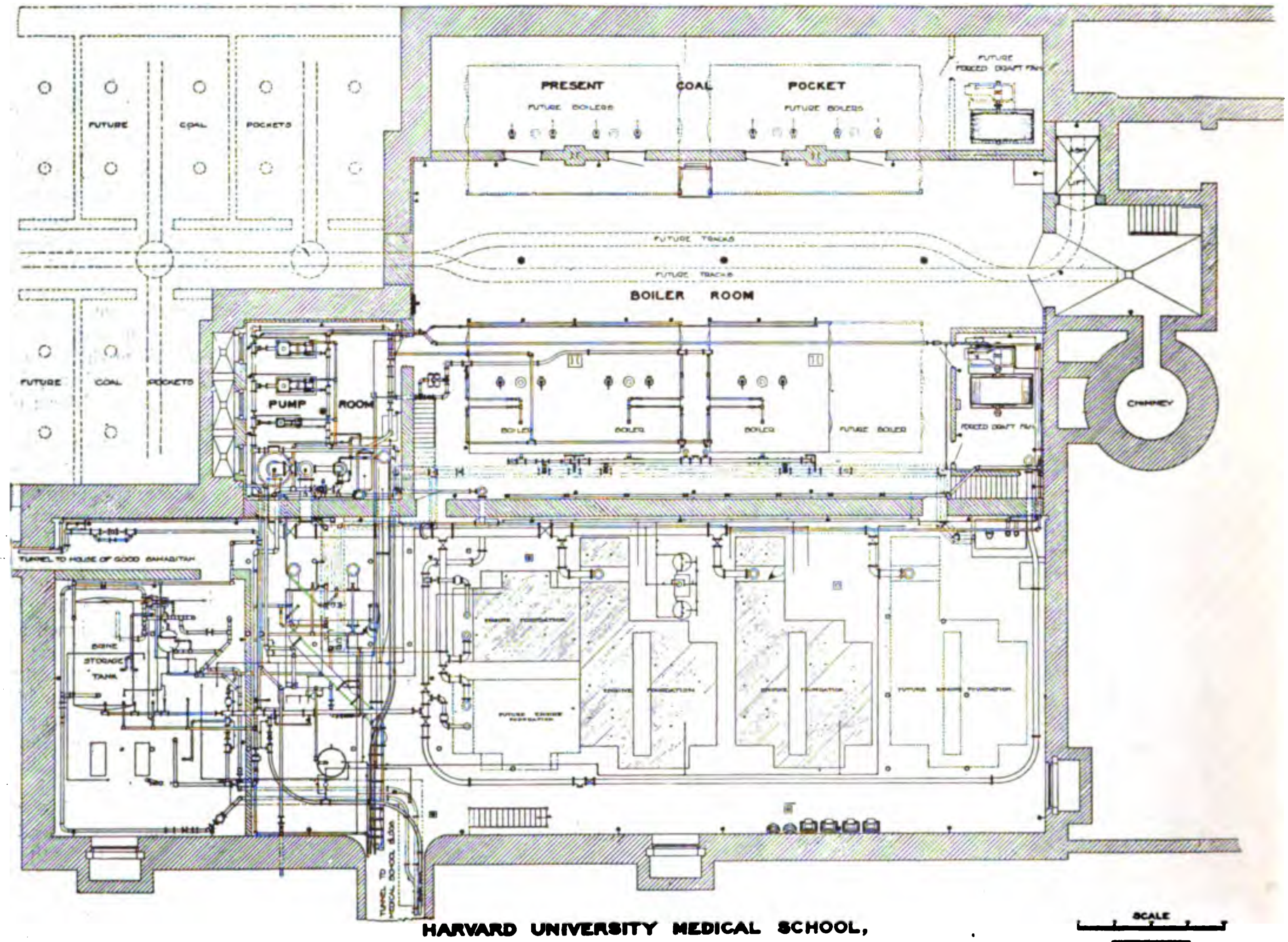
Corporation and the architects. The contract was let to the Norcross Bros. Co. on August 12, 1903, and work was at once begun.

The final lay-out of the buildings as shown in the perfected plan is based largely on what is known as the unit-system, but differs from other unit-systems in this fact: that all previous unit-systems duplicated each section teaching-room, say of twenty-four feet square as a unit, and the new Medical School takes a unit of ten feet, which is a window and half a pier-space on each side of the window as a unit. These ten-foot units are used for a single research-room, but as the walls of the building which are permanent are only the outside walls and those along the corridors, it permits the intermediate walls, which form the two sides of the room, to be taken out at any time and new rooms formed level and adjoining are two preparation-rooms, one on each side, while the students enter from the main floor.

The plan finally adopted consists of five buildings with their fronts grouped around a quadrangle two hundred and fifteen by five hundred and fourteen feet, with the Administration Building in the center of the south end of the quadrangle. The corridor, which connects them all, passes through the basement of the Administration Building, but is on the ground floor of the others and is carried under the Administration Building terrace. Between the laboratory buildings the corridor is one story above the ground, with only the pipe-tunnel under it.

The accompanying plans will explain more clearly than any verbal description.

One of the advantages of the present arrangement is that the



HARVARD UNIVERSITY MEDICAL SCHOOL,
BOSTON, MASS.
BASEMENT PLAN OF POWER HOUSE.

FIGURE 2.

which may be ten, twenty, thirty, or any multiple of ten feet in length as may be required in the future.

The general section teaching-room throughout the buildings, except that for pathology and bacteriology, is a room which will accommodate twenty-four students with the apparatus and tables which are necessary in their work. This, at the present time, seems to be the most economical number for one instructor to have under him in many of the departments. Such a room consists of three units of ten feet. All of the buildings except the Administration Building, which is in the center and raised above the laboratory buildings by a terrace which takes up the difference in level of the ground from the south side of the buildings to Longwood Avenue, consist of two laboratory wings joined together by a lecture-room which is entered at either end, with the libraries of the affiliated departments over it. These lecture-rooms can be used by the men in one laboratory without disturbing those in the other, as the doors by which they are entered are on opposite sides. The lecturer's desk is on the ground floor

front on the quadrangle is a completed façade and allows additions to be made to the different laboratories, as time may require, without disturbing the architectural effect of the quadrangle.

In designing the buildings, the architects chose a style which permitted great simplicity, and they relied on the relation of the masses to produce the effect rather than upon any elaboration of detail. The style is an adaptation of the original Greek. The doorways of the laboratories are similar to those discovered in Assos by the American expedition.

The distance between the buildings and the wings was determined by actual experiments on the site, and the buildings were placed far enough apart to allow the sun in winter to reach the basement windows.

In every case special attention was given to light. The windows in the teaching laboratories go to the ceiling and are high enough to allow the use of microscopes in the rear desks.

The large central building of the group is the Administration Building, which contains, on the first floor, the Faculty-room,

and adjoining it the offices of the Dean and Secretary, the telephone exchange, janitor's-room, a large reading-room for the students with a smoking-room connected with it, and a room for the alumni.

On the second floor on the east side is an amphitheater for lectures on surgery, and on the west side a large room for medicine, obstetrics, theory and practice of medicine, and other subjects. There are also two smaller lecture-rooms at the head of the staircase.

The Warren Anatomical Museum occupies the whole of the three upper floors, and is lighted by skylights, glass floors between the cases as well as windows in every alcove, and is connected with the unpacking-room in the basement by a large elevator. There are also rooms for the curator of the museum on the third floor.

the most modern conveniences, and also have rooms devoted to special research-work by individuals.

The library in this building differs from the others in that the books are arranged in stacks instead of wall-cases.

This and the two preceding buildings were provided by Mr. J. P. Morgan.

Next to the Anatomy Building on the same side, and on Longwood Avenue, is the C. P. Huntington Building for pathology and bacteriology. This differs from the others in that the teaching laboratories take up one wing, and the professors', instructors', and research-rooms occupy the whole of the other or south wing.

The teaching laboratories, of which there are four, are twenty feet high, and this height allows two ten-foot stories on the research side for each teaching laboratory, so that the building

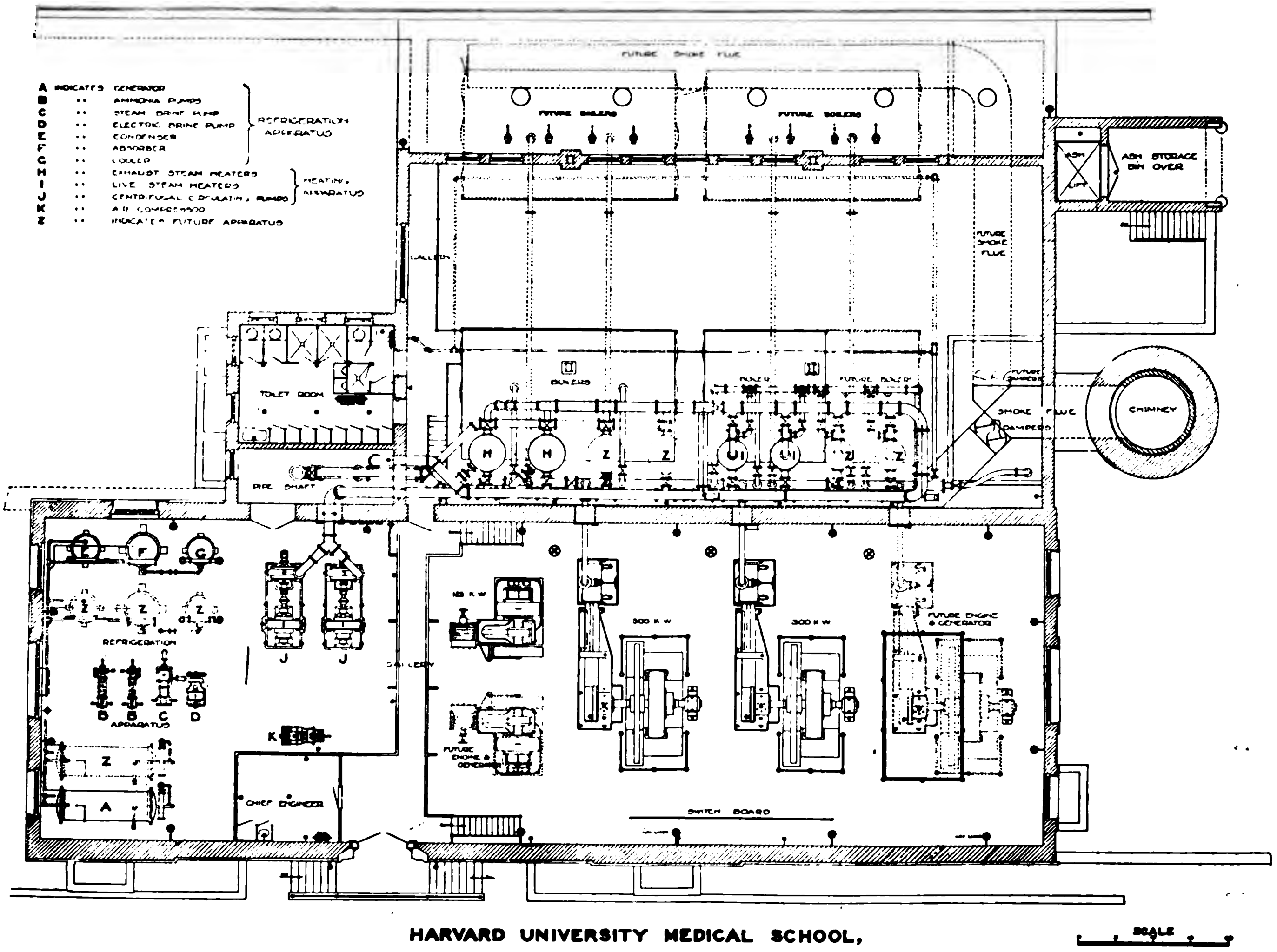


FIGURE 3. HARVARD UNIVERSITY MEDICAL SCHOOL, BOSTON, MASS. FIRST FLOOR PLAN OF POWER HOUSE

in the teaching wing is, including the entrance floor, three stories, and on the research side five stories high.

The teaching laboratories each have a capacity of forty-eight students. Besides the research-rooms in the south wing there are rooms devoted to gross photography, also photomicrography and ultra violet photomicrography; four rooms are also devoted to surgical pathology.

In the rear of the building is a separate structure for the housing of animals. Besides the smaller animals it is arranged for large ones, such as cows.

On the opposite side of the quadrangle from pathology and bacteriology is the David Sears Building, devoted to hygiene, pharmacology, therapeutics, and comparative pathology and surgical research. Pharmacology and therapeutics occupy the south wing with space on the third floor for surgical research. The north wing has on the front the Department of Hygiene, which, besides its teaching laboratories, has a museum for exhibiting foods and appliances relating to public health.

In the basement are the rooms for x-ray photography and instruction in bandaging. There are also locker-rooms and lavatories for the students.

To one standing in the court facing the Administration Building, on the left, next the Administration Building is that for anatomy and histology. It contains also the departments of Operative Surgery and Comparative Anatomy. The Anatomical Department occupies the south wing and Histology and Comparative Anatomy the north wing.

The building opposite anatomy to the right of the Administration Building is devoted to physiology and physiological chemistry, physiology being in the south wing. Besides the section teaching-rooms there are rooms for research-work, an operating-room for animals and sets of rooms for animals under observation, which have been arranged with especial care. There are also animal houses on the roof especially ventilated and arranged with yards for exercise in the open air.

The laboratories for physiological chemistry are fitted with all

The Department of Comparative Pathology occupies the rear half of this wing on all floors. It has on the two lower floors laboratories for students and professors, a room for autopsies and small rooms to be used in connection with the laboratories. The upper floors are devoted to research and original work. On the top floor are animal rooms with an operating room adjoining.

All the amphitheaters have two preparation-rooms, one on either side, and automatic screens for shutting out the light, worked by a button at the desk. Special platforms for the lanterns are so arranged that there will be no distortion in the image thrown upon the wall.

The heating, ventilating, lighting, refrigerating and power plants were worked out by Messrs. Densmore & LeClear in conjunction with the architects, and the general scheme is as follows:

The central walls on either side of the corridors in all the buildings are hollow and contain all the heating and ventilating flues. The system used is indirect hot-water. The hot, fresh air is forced by fans from a plenum in the basement into the upper part of the rooms and exhaust-fans pull out the foul air from the lower level. In the chemical laboratories the foul air goes out through the hoods as well as the exhaust-ducts. Sufficient direct radiation, however, is installed to keep the buildings moderately heated during the night and Sundays when the fans are not running. Below the corridor, which gives communication between all the buildings, there is a tunnel which connects with the power-house on Vila Street. In this tunnel are carried the hot-water pipes for the heating, hot water for the hot-water service in all the buildings, gas and steam-pipes, electric conduits, brine for the refrigeration and all other necessary pipes. This tunnel is large enough for men to work in freely. In the power-house are installed all the necessary appliances for heating, lighting, refrigerating, and power. It is also intended to supply the different hospitals from this same station.

It is proposed to eventually close the end of the main quadrangle on Longwood Avenue with an iron fence and gates of a monumental character, one at the entrance of the terraces on either side and a large gate in the center of the quadrangle. This fence and gates, it is hoped, will be contributed by the classes of the Medical School on their graduation.

A boulevard one hundred feet wide will be constructed on the north and south axis of the quadrangle connecting the Medical School buildings with the Fenway. This will be planted with elms on either side.

At the junction of Longwood Avenue and the Boulevard there will be a plaza starting on the line of the buildings in the quadrangle and sweeping in the arc of a circle until it intersects the boulevard. Thus the buildings will have a suitable and dignified approach.

The Mechanical Plant, Harvard University Medical Schools.

THE following description of certain parts of the mechanical equipment at the Harvard University Medical Schools is abstracted from a report of the engineers, Messrs. Edward D. Dinsmore and Gifford LeClear. We are indebted to the *Harvard Graduates' Magazine* for the various plans and sections which accompany the article:

It is the purpose of this article to describe those features of the mechanical plant which may be of general interest, or which are peculiar to this plant, omitting technical details. No attempt is made to present reasons for the selection of the systems used, or to indicate the relative advantages of these systems as compared with other systems. These matters were taken up in detail in a report prepared by the engineers and presented to the Corporation of Harvard College before the preparation of contract drawings and specifications was begun. The entire plant, both as regards details of equipment, and as regards extensions for the future, is in accordance with a carefully prepared plan. An important consideration in the design of the mechanical plant was the provision for a large but somewhat indefinite increase in the size of the plant, for possible future hospitals or other buildings associated with the school and for the enlargement of the school buildings.

The plan of the Medical School grounds, Figure 1, shows the five school buildings, and the possible additions to them, the power house, the tunnel between the school buildings and the power house, the house of the Good Samaritan Hospital, with its connecting tunnel, and the space reserved for future hospitals. It has been found convenient to designate the five buildings of the school by letters; the Administration Building is known as "Building A," and the four laboratory buildings as "Buildings B, C, D, and E"; Building B is for Histology and Anatomy, Building C for Physiology and Physiological Chemistry, Building D for Bacteriology and Pathology, and Building E for Hygiene and Pharmacology.

POWER HOUSE AND EQUIPMENT.

The power house is located on the north side of Vila Street, a good location for this and other service buildings. The main lot is thus left free for future development, and the objectionable features of a power house removed as far as possible from the Medical School buildings and hospitals.

Figures 2 and 3 show the basement plan and first-floor plan of the power house, and Figures 5 and 6 a cross section of the power house, and a section through the Medical School grounds. The boiler-room is located at the rear of the power house, so that the noise and dirt due to the handling of coal and ashes may be on the side away from future hospitals. The brick fence at the front of the power house screens the approach to the coal-pocket and ash-bin, and incloses a yard which can be used for storage. The coal-pocket is so located that coal can be dumped directly into it from teams driven over it. A bin for the temporary storage of ashes is located above the ground level so that a wagon can be backed under it to receive the ashes. The ashes are carried up to the bin on a hydraulic lift. The engine-room, which takes up the entire front of the building, is lighted from skylights and from windows at the end. There are no windows in the front wall, which is the side facing the location for future hospitals. The chimney is high enough (175 feet) to carry away the gases and dust and prevent their being blown down into the windows of the hospitals or of the school buildings. The relative heights of the buildings and chimney are shown on the section of the grounds, Figure 6. Special care has been taken in the design of the plant to prevent smoke; in this connection a fan for running the boilers under forced draught is installed so that a cheap grade of hard coal, either alone or mixed with soft coal, can be burned. The floor plans, Figures 2 and 3, show, not merely the present equipment, but possible future equipment, present machinery being indicated by full lines and future machinery by dotted lines. Additional boiler capacity can be obtained by the addition of one boiler by the side of those already installed, and also by a complete additional battery of boilers, facing the present battery, and occupying the space now utilized as a coal-pocket. A permanent coal-pocket could be built at one end of the boiler-room, where there is opportunity to obtain ample coal storage. The permanent coal-pocket, made up of a number of small pockets to reduce the danger of spontaneous combustion, is indicated on the basement plan, Figure 2. Space has been left in the engine-room for additional engine and generator capacity and for a duplication of the refrigeration apparatus. All of the piping is designed for future connection to additional apparatus. The gallery, which crosses the engine-room and the boiler-room, is on a level with the chief engineer's room and with the entrance. By means of it the chief engineer can reach any part of the power house quickly, and from it he can see all the machinery, both in the engine-room and in the boiler-room. It also serves as a visitors' gallery, from which a view of the power house equipment can be obtained without trespassing on the engine-room or the boiler-room floor.

TUNNELS, PIPE-PASSAGES, AND SUB-BASEMENT.

The sub-basements of the four laboratory buildings are connected by passages, located under corridors which connect the ground floors of the buildings. The passage which connects the sub-basements of Building B and Building C runs under the Administration Building, which has no sub-basement. A tunnel connects the sub-basements with the power house, running from one end of Building C, as is indicated in Figure 1. The relative grades of the tunnel, sub-basements and building floors are indicated in Figure 6. The sub-basements are partially excavated as required for heating and ventilating apparatus, electrical switchboards, gas metres and piping, plumbing pipes, etc. The heating mains, electrical cables, brine mains, etc., are run through them and through the connecting passages and the tunnel, special care having been taken in planning their installation to avoid obstructing the passages, and to so arrange them that they can be easily inspected and repaired. A typical cross section and a

typical longitudinal section of the tunnel are shown in Figure 7. The tunnel between the power house and the school buildings makes a convenient passage for the engineer and attendants in charge of the mechanical plant. The pipe tunnel between the power house and the house of the Good Samaritan Hospital, shown in Figure 1, is not large enough to be used as a service passage.

HEATING AND VENTILATING SYSTEM.

The buildings are warmed by hot water, heated in tanks or heaters located above the boilers, in the power house. Circulation of the hot water through the piping and radiators of the buildings is maintained by means of centrifugal pumps, located in the engine-room. The exhaust steam from all of the engines, pumps, etc., in the power house is used for heating the water, supplemented by live steam from the boilers when the exhaust steam is insufficient. Two of the four heaters installed are used for exhaust steam heating only, the other two being reserved for fresh air at or about the temperature of the room. In some rooms, however, notably dissecting-rooms, direct radiators have been omitted, the heating being done by groups of indirect radiators located in the sub-basements.

The temperature throughout the buildings is largely regulated by varying the temperature of the water in accordance with the outside temperature, but in addition to this, the radiators are provided with automatically controlled valves operated by thermostats in the rooms. This automatic regulation is necessary on account of the difference in temperature caused by the wind, or by the uses to which a room is put, or the number of people in it. The temperature of the dissecting-rooms, which are heated by indirect radiators, is controlled by means of mixing dampers which are operated from the rooms by hand.

The general system of ventilation in the laboratory buildings is shown in Figure 8, a typical floor plan. Figure 9 shows a typical half plan, on a larger scale, and a typical cross-section

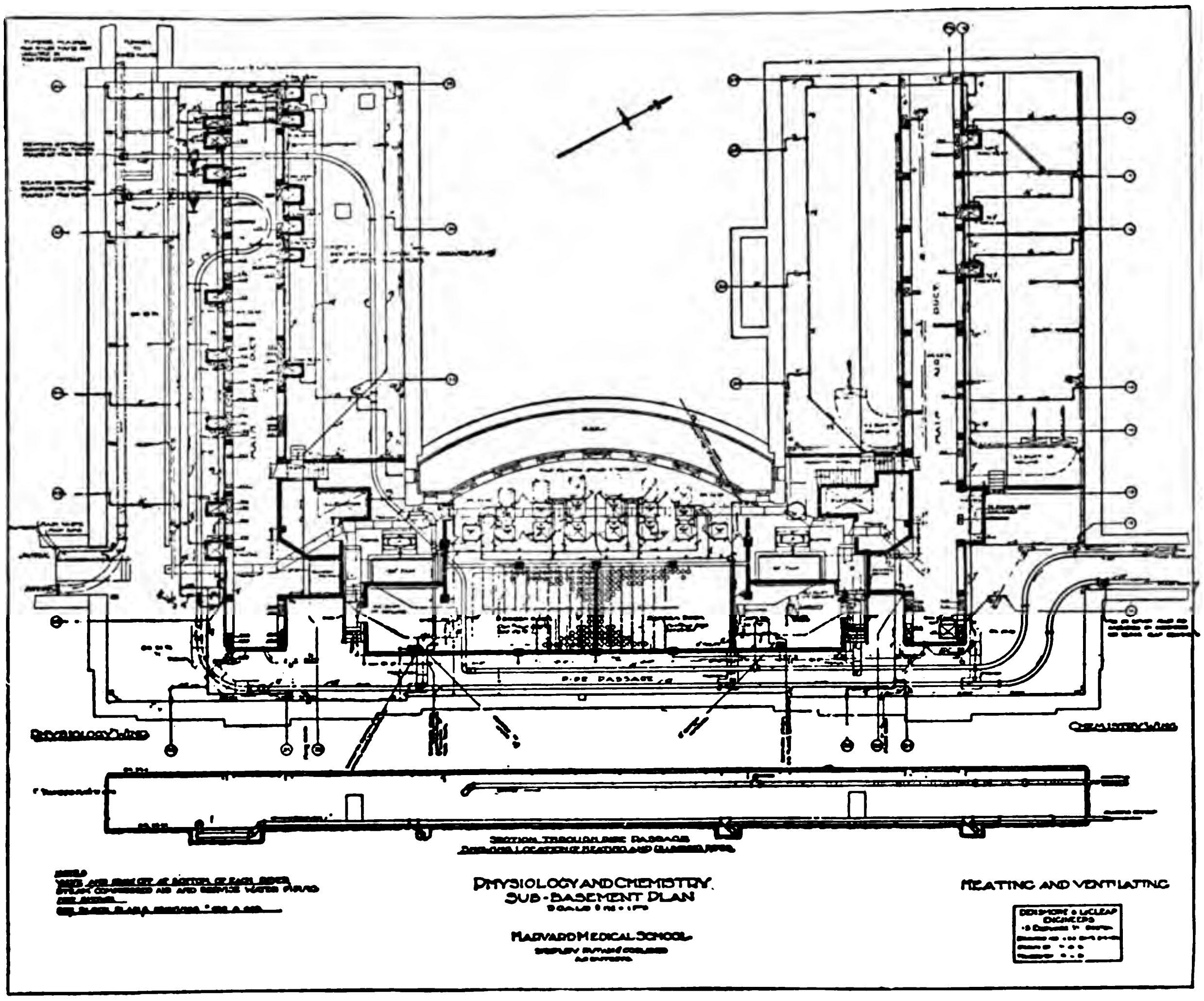


FIGURE 8.

live steam heating. In this way the condensation from the exhaust steam, which contains oil, injurious to boilers, can be thrown away, while the condensation from the live steam heaters is returned to the boilers by gravity, without the use of pumps or traps. The two centrifugal pumps for maintaining the circulation of the hot water are driven by electric motors, one pump and motor being used at a time, and the other held as a reserve. It is to be noted that the exhaust steam from the engines, which drive the generators furnishing current to the pump motors, is used in heating the water of the heating system.

The temperature of the water can be readily adjusted to meet the weather conditions, thus obviating to a large degree overheating, a source of great discomfort. Moreover, overheating is an expense, and a marked saving is obtained when it is possible to regulate the temperature of the heating medium in accordance with the weather.

The buildings are heated, for the most part, by radiators located in the rooms, and ventilation is obtained by introducing and a typical longitudinal section through one of the wings. The fresh air for ventilation enters the sub-basements at the rear of the central parts of the buildings, is heated to the desired temperature by indirect radiators, screened of dust and dirt by special screen bags, and discharged by two inlet fans, motor driven, one for each wing, into main air-ducts or pressure-chambers, running the length of the wings, in the sub-basements. The main air-ducts are of masonry, and are large enough for an attendant to enter them for cleaning, adjusting dampers, etc., and are as free from pipes and apparatus as possible, so that they may be kept clean. The air passes from the main air-ducts to the rooms above through individual galvanized iron ducts, one to each room.

The vitiated air is withdrawn from the rooms, through galvanized iron outlet ducts, by means of fans, located on the roofs. There is a main outlet duct on the roof of each wing, into which all the outlet ducts from the rooms connect and from which the outlet fan discharges the vitiated air. These main outlet ducts,

like the main air-ducts in the sub-basements, are large enough for an attendant to enter for the purpose of adjusting dampers at the tops of the outlet ducts, for starting and stopping the motors which run the outlet fans, etc. In general, there is one main outlet fan for each wing of each laboratory building, but in special cases additional fans are installed.

The system is flexible and can be made to give satisfaction under varying conditions; both the inlet and outlet fans can be run at speeds to correspond with the amount of ventilation required, and when a building is only partly in use the outlet fan need not be run.

The ducts, both inlet and outlet, are located, for the most part, in the corridor walls, which are specially framed for the purpose so that they interfere very little with the design or equipment of the rooms. Being straight, with very few offsets, they do not readily catch dirt or dust, and can, moreover, be easily cleaned. There is a damper at the foot of each inlet duct and at the top covering the fundamental principle of the system. A number of installations in the form used at the Medical School have been made by the engineers and have been found satisfactory.

The temperature of the ventilating air is controlled, as is the temperature of the rooms, largely by the adjustment of the temperature of the water of the heating system to the temperature of the outside air. In addition to this, however, the groups of indirect radiators are provided with by-pass dampers automatically controlled, by means of which cold air is by-passed around the radiators, until the mixture going to the fans is at the temperature desired.

In addition to the outlet fans of the general ventilating system, special fans are located on the roof for ventilating chemical hoods, fume closets, etc., and into these fans the outlet ducts from the toilet-rooms are, in general, connected. The fans are small and can be run at slight expense, whether or not the main outlet fans or any other part of the ventilating system is in use.

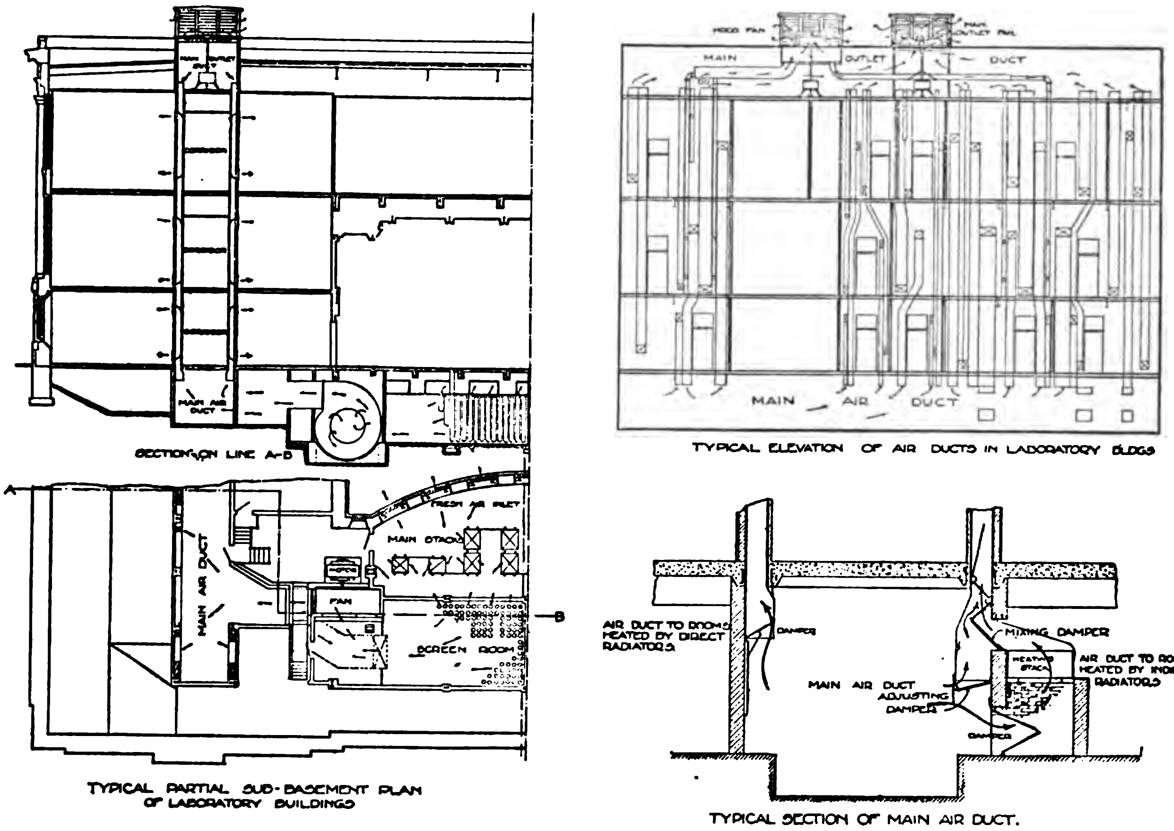


FIGURE 9.

of each outlet duct, readily accessible for adjustment from the main air-ducts in the sub-basements and the main outlet ducts on the roof. Each room is numbered and the dampers correspondingly numbered, so that they can be identified at once if the ventilation of any room requires adjustment or if any room is temporarily closed, requiring the dampers to be shut to save the expense of ventilating.

The rooms in which the main stacks of indirect radiators are located are large enough for all the radiators that will be required if the buildings are extended, but the radiators now installed are sufficient only for the buildings as now built, and are consequently of different sizes for the different buildings. Figure 10 shows a typical arrangement of one of these heating stacks.

The screening of the ventilating air is done by forcing the air through bags made of heavy cotton sheeting. The bags are hung on collars in a galvanized iron ceiling and the air passes down through the open upper ends of the bags and out through the sides, as indicated in Figure 10. This system makes it possible to obtain a very large area of screening surface with a comparatively small floor area. There are no leaks through which dust and dirt can pass, as in the case with cloth screens on frames, and the bags are readily removed for cleaning, which need not be done more than once a year. Mr. C. J. H. Woodbury, of the American Bell Telephone Company, holds a patent

Special akron ducts are run from the chemical hoods, with cast-iron dampers at the openings into the hoods.

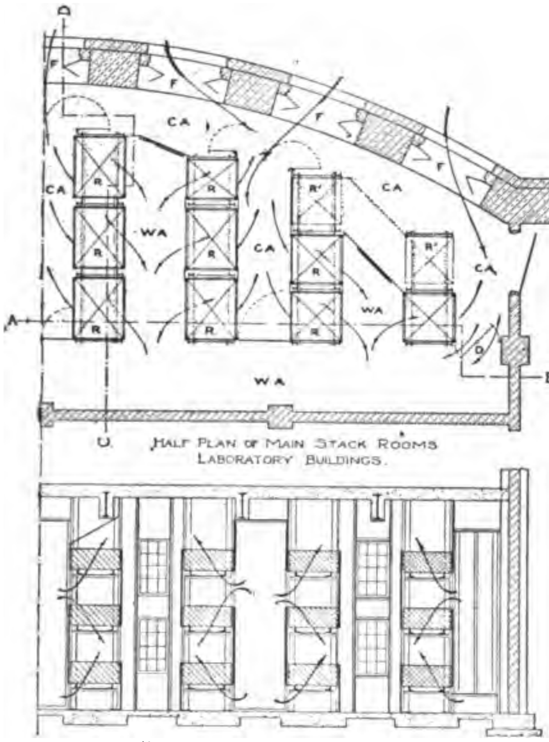
A typical chemical hood, with the akron outlet duct, and the arrangement of the outlet fan and connections are shown in Figure 11. There is an outlet chamber under each hood fan into which all the ducts from hoods, etc., connect, thus keeping the entire hood ventilating system entirely independent of the main ventilating system. The special outlet chambers and the ducts connecting them with the tops of the akron ducts from the hoods are exposed in the main outlet ducts. They are made of galvanized iron and are thoroughly coated with tar on the inside.

There are several "Constant Temperature" rooms where it is desired to maintain a temperature of about 98° F. at all times of the year. These rooms are heated by indirect steam radiators located in the sub-basements, the steam being taken from the service steam system, which is run for laboratory purposes, and is consequently available whether the heating system is in use or not.

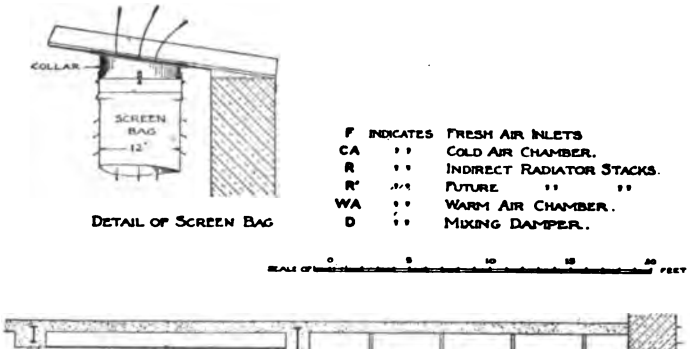
On the roof of Building C there are a number of small rooms or cages intended for animals. These rooms require ventilation at practically all times, whether or not the regular building ventilating system is in use. On this account a ventilating system, with inlet fan, is installed on the roof, arranged to be operated independently of other ventilating apparatus in the building.

In the Administration Building the same general system of heating and screening the fresh air for ventilation is used, but the same systematic arrangement of ducts is impossible. The direct radiators on the first floor are recessed into the walls for the sake of appearance and increased floor space. There are no outlet fans, the vitiated air being carried from the buildirg by gravity. The expansion tank for the hotwater heating system is located in this building.

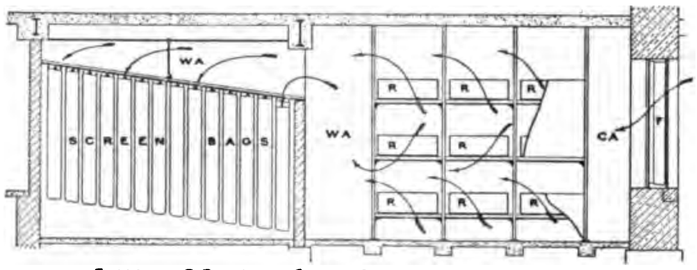
It is worthy of note that double windows have been quite generally used on the large windows in the laboratory buildings, particularly those which have northerly exposure. The double windows were installed largely to prevent the troublesome drafts from the large windows, particularly when desks or tables were to be used directly under them. It was considered undesirable to have radiators under the windows. The double windows are also a considerable advantage from the standpoint of economy of operation.



HALF SECTION OF MAIN STACK ROOMS ON A·B LABORATORY BUILDINGS



DETAIL OF SCREEN BAG



SECTION ON C·D THROUGH SCREEN BAG AND MAIN STACK ROOMS.

FIGURE 10.

ELECTRICAL WORK.

Electricity for lighting, for fan-motors, elevator motors, workshop motors, electric heaters, etc., is supplied from the generators in the power house, a direct current three-wire system being used, 110 volts for the lights and 220 volts for the motors. A system of three-wire lighting mains is run throughout the sub-basements of the building for lighting service, and a separate system of two-wire 220 volt mains for power. Each of these systems is fed at two points by feeders from the power house, one set of lighting feeders and power feeders being run in the tunnel from the power house to building C, the other set of lighting and power feeders being run directly across from the power house to building E. In other words, the two sets of feeders connect with a network of mains which join the switchboards in the various buildings. There are nine of these switchboards, one in each wing of the four laboratory buildings, and one in the Administration Building. Connecting mains are also run from building E to building D and from building C to building B. This system is used to obtain a uniform distribution of voltage, and is less expensive with two feeders than it would be if only one feeder were used.

If extension is required by the erection of hospitals, it is probable that a third set of feeders would be run from the power house to a central location beyond building A of the Medical School. Mains would also be run, connecting the end of this feeder with the end of the feeder which now runs through the tunnel to building C. The set of feeders from the power house to building E is not yet completed, since, if hospital buildings are erected between building E and the power house before this feeder is needed for the purposes of the School, it is probable that the feeder would be run, for part of its length at least, through the basements of some of the hospital buildings. The Good Samaritan Hospital is now temporarily connected by means of cables run direct from the power house through the pipe tunnel, but it must eventually be connected at some point on the present or future system of mains.

The power feeders and mains and the lighting feeders and mains are independent of each other from the switch-board in the power house, but parallel to each other throughout their entire length. The arrangement of the cables in the tunnel is indicated in Figure 7.

The wiring system in the buildings is designed to fulfill the requirements of laboratories. There is a separate cut-out cabinet in practically every room, fed from the switchboards in the sub-basements, so that each room is independent, and as the cut-out cabinets are located near the floor they are readily accessible. Opportunity is given in every room for the addition of circuits for special work requiring arc lamps, electrical heaters, or other electrical apparatus. In some of the rooms, notably in the general chemistry room, building C, special cut-out cabinents have been installed for electric-heater circuits, fed by special mains from the switchboard in the sub-basement.

All of the rooms are provided with lights for general illumination and, in addition, with special lights for work-benches, tables, hoods, etc. Only those fixtures for such special lights were designed by the engineers. The corridor and stairway lights are controlled by switches by means of which night lights can be turned on and off by the watchman as he makes his rounds, or by a physician or student engaged in night work.

REFRIGERATION.

The principal use of refrigeration in the Medical School is the preservation of cadavers, the room for which is located in building B, the building for histology and anatomy. There are, however, a number of comparatively small cold rooms in the other buildings where refrigeration is necessary. All of the cold rooms are cooled by means of pipe coils through which cold brine is circulated. None of the dissecting-rooms are cooled at present, but space is reserved in the sub-basement of building B, where apparatus for this purpose can be installed when desired.

The refrigeration apparatus is located in the power house, the "absorption" system being used. A well has been driven to supply the cooling water. The special feature worthy of note in connection with this apparatus is that it is designed for the use of exhaust steam from certain parts of the apparatus in the power house, thus making a marked saving in the cost of operation, for in this plant there will be considerable exhaust steam which would otherwise be wasted during warm weather, the time when refrigeration will be most required. The exhaust from the various pumps, air-compressors, etc., is used under a small back pressure for this purpose, and will be sufficient for

the present, but the piping is so arranged that the exhaust from one of the small engines could also be used if necessary in the future. The exhaust from the large engines is not used, since it would be uneconomical to run a back pressure on them for this purpose. In this connection it is interesting to note that the exhaust steam is used for heating the water in the heating system without back pressure. The cooling of the brine is done by the expansion of compressed ammonia gas, as in most refrigerating installations. The cooled brine is pumped from the power house through the tunnel and sub-basements to the coils in the various cold rooms, just as the hot water for the heating system is circulated. Special care has been used in the covering for the brine pipes, to prevent loss from the mains. The pipes are covered with sectional cork covering put on in two layers with all joints broken. A special feature is the support of the pipes; they are hung by bands of galvanized iron outside of the covering, as is indicated in Figure 7. This prevents the necessity of hangers passing through the insulation, as is the case in the ordinary method of support. There are two pumps for circulating the brine—one a centrifugal pump driven by a motor, and the other a direct-acting steam pump. Only one of these pumps is used at a time, the other being held as a reserve.

A closed system of brine circulation is used; that is to say, the circulating pump forces the brine through the mains to the cooling coils and back through a return main to the refrigerating machinery, and hence again to the pump. In this way the only head against which the pump has to act is the friction head caused by the flow of the brine through the pipes and coils. An open expansion tank is connected with the system above all the coils, just as in the case of the hot water heating system, to free the system of air and to allow for the expansion and contraction of the brine.

There is a large closed tank in the basement of the power house through which the brine circulates, thus making it possible, due to the storage in the tank, to run the brine circulating pump and do considerable cooling after the refrigerating apparatus is shut down. The refrigerating apparatus for the present and for the future is shown on the first floor plan of the power house, Figure 3.

The room for the preservation of cadavers is shown in Figure 12. It is in reality two rooms opening onto an ante-room, to which admission is obtained through the corridor of the basement floor of building B. At the rear of the ante-room there is a small refrigerating box for the storing of small parts. The ante-room serves as an air lock, an important consideration in the economy of operation. The use of two rooms makes it possible to store all of the material temporarily in one room while the other is being cleaned, or to close one room entirely when there is not sufficient material on hand to warrant the use of both. The cooling coils are located on the ceiling, and are divided into parts so arranged that each part may be cut out periodically for the removal of frost. The valves for the coils are all located in the ante-room, where the main distributing pipes are run. One of the smaller cold rooms is also shown in Figure 12.

MISCELLANEOUS SERVICE SYSTEMS.

Pipes are run from the power house through the tunnels and sub-basements to the school buildings for supplying steam and compressed air. The steam is carried at about 50 pounds pressure, and is used largely for laboratory purposes. Compressed air is required in the laboratory buildings for blow-pipes, filters, and other laboratory purposes. The air is compressel in the power house by a steam compressor, and is carried at about 50 pounds pressure to the buildings. In each building where air is required there is a storage tank and a reducing valve which maintains a lower pressure, from 5 to 20 pounds, according to requirements. Compressed air is also required throughout the buildings for the automatic control of radiator valves, mixing dampers, etc. The air used for these purposes is supplied through the same main from the power house as far as building C, but from this point separate mains are run through the sub-basements. In each building there is a storage tank, reducing valve and filter, from which small pipes are run to the various valves, dampers, thermostats, etc. Advantage is also taken of the compressed air system to locate nozzles near the electrical machinery, in the power house, for cleaning the commutators, armatures, etc.

The service hot water is heated in the power house in two heaters, one using exhaust steam and the other live steam; the latter being used only when sufficient exhaust steam is not available. The circulation of the water in the mains is maintained by means of a small centrifugal pump, driven by a motor.

A complete system of telephones has been provided for, with a central office in the Administration Building. Wire-moulding is run on the corridor walls, and, in addition, a tube is run into every room, so that telephone wires can be carried into any room without cutting.

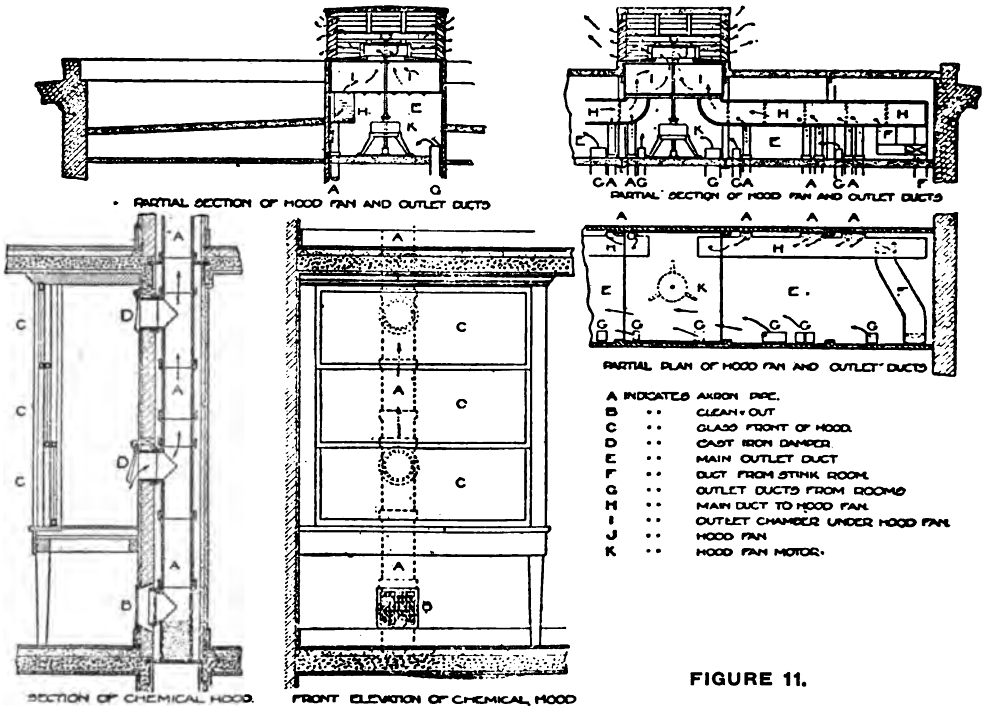


FIGURE 11.

A system of "thermophones" is installed, by means of which the engineer in charge at the power house can tell the temperature of the air in each of the main air ducts, and in the cold rooms.

Electric time clocks have been installed in the main corridors and in the larger rooms, all controlled by a master clock located in the office of the Administration Building. Watchman's clocks have also been installed throughout the institution, their location being carefully selected to insure a complete inspection of the buildings.

It has been necessary to omit many details and more or less interesting features of the mechanical plant on account of limited space. In fact, only the barest outline has been attempted. It has been the aim throughout the entire design of the plant to obtain good service at the least cost of operation, including in the cost of operation not merely the coal burned, the labor, etc., but the cost of maintenance, repairs, etc. In other words, permanency has been considered an important step towards economy of operation. All of the pipes, cables, etc., have been located with care so as to permit of accessibility for inspection and repairs. To this end the engineers worked in conjunction with the architects in regard to the design of the sub-basements, pipe passages and tunnels, while the buildings were being planned. Arrangements have been made for adjusting the various parts of the systems; for measuring the work done, and for keeping records of the operation, so that not only can the best results of which the plant is capable be obtained, but advantage can be taken of the experience gained by the actual operation of the plant.

The Baryta Treatment of Decayed Stone.[1]

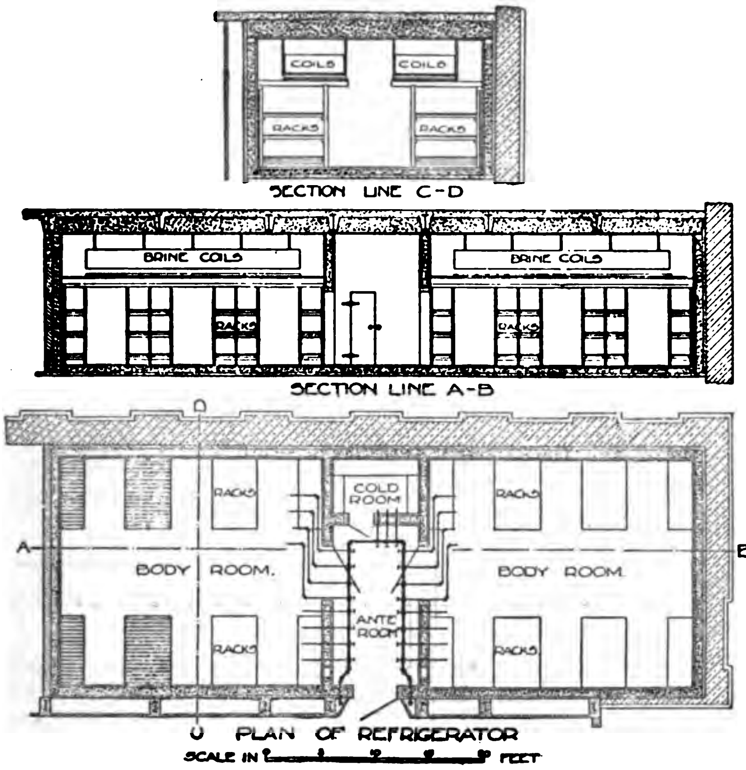
WHEN the decay of stone has been caused, or partly caused, by the attack of sulphuric acid, the use of baryta is indicated. The easiest way of applying this earthy base is in the form of baryta-water. This is a solution in distilled water of barium hydrate, also known as barium hydroxide and as hydrate of baryta. Supposing that one has at hand a solution of this compound, saturated at the summer temperature, then the following directions for applying it to decayed stonework should be followed:

Remove dust and loose particles of stone from the surface to be treated, by means of a jet of air, there are cases where the stone may be safely cleansed by means of a dry brush. Then the baryta-water should be applied in the form of spray to the tender surfaces of the decayed stone, the use of a brush of any kind, at this stage, being generally inadmissible. The spraying should be repeated, at intervals of two or three days, until the treated stonework has become hard enough to bear the application of a paint brush freely charged with baryta-water; in some cases a garden syringe having a fine rose-jet is a convenient instrument to employ. For all external stonework and in all interiors not artificially warmed, the baryta-treatment must be carried out in the summer, preferably in dry weather. The baryta-solution, which penetrates to a considerable depth in the case of porous stones, seldom hardens the surface appreciably until it has been applied several times; eight or nine applications were generally required in the case of the decayed firestone in the interior of the Westminster Chapter House, while the mouldings and carved work received several extra sprayings or paintings. On the average, in this case, one gallon of baryta-water served for a single treatment of twenty superficial yards. Here it may be mentioned that disfiguring incrustations, such as those formed by the drip from corroded Portland stone, ought to be removed previous to the application of the baryta treatment.

Several cautions must be given as to the carrying out of the baryta-treatment. Baryta-water being poisonous, the workmen engaged in applying it must be told of the necessity for washing their hands before eating. And as the fine spray is liable to be inhaled, it is advisable for the men to place occasionally on the tongue a crystal of sulphate of soda and to swallow the solution formed; thus any soluble barium compounds in the mouth are changed into the insoluble and harmless sulphate. Furthermore, the baryta-water must not be exposed more than can be helped to the air, as its strength, and in consequence its efficacy, will be impaired by the absorption of carbonic acid, which causes a precipitation of the carbonate. Then, too, the baryta-water must not be allowed to cool below 60° Fahr., or it will be weakened by the separation or crystals of barium hydrate.

The chemical changes brought about by the baryta-treatment are mainly these: The soluble sulphate of lime, that is, gypsum, in the decayed stone is converted, in part or wholly, into insoluble sulphate of baryta with the simultaneous production of hydrate of lime. The latter will be changed gradually into carbonate and will then have reassumed its original state. It is to this change that the hardening and consolidation of the decayed stone are mainly due, but it may be weeks, or in some cases months, before this process is complete. The experience of four years indicates that the baryta-treatment involves no risk of bad consequences, but it is possible that, after the lapse of a decade or two, further treatment with baryta may prove desirable.

A few words about the baryta-solution may be useful. If it be purchased ready prepared its strength should be specified as "saturated at 60° Fahrenheit." When required in large quantities it may be made by shaking up (in a closed vessel) until dissolved ten and a half ounces of the ordinary crystals of barium hydrate in one gallon of distilled water. But another commercial product—fused barium hydrate—purchasable in the condition of crushed fragments, is stronger, cheaper, and less liable to deterioration. Only eight ounces of this substance are required for one gallon of water. It is a convenient plan to place four ounces of this preparation in a stoppered "Winchester" and then to fill the bottle with recently-boiled and still warm distilled water. By agitating the contents of the bottle for some time solution will be effected; the trifling insoluble residue may be neglected. Note that this fused barium hydrate differs from the ordinary crystals in containing five molecules of water of crystallization instead of eight. In small quantities it costs about £1 per cwt.; consequently, apart from the charge for the distilled water used, the preparation of eleven gallons of baryta-water entails an expenditure of rather less than one shilling.



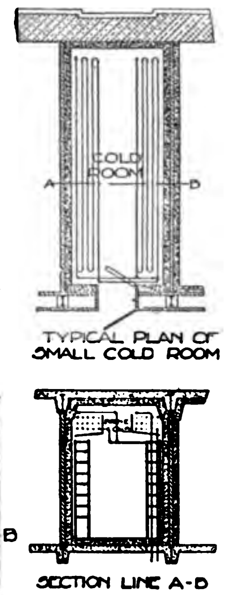


FIGURE 12.

In country places where little coal and perhaps no coal-gas are burnt, the amount of sulphates in decayed stonework may prove insufficient to render the baryta-treatment effective. Under these circumstances the question arises whether the introduction into the decayed stone of such a sulphate as that of aluminium might not be tried. Laboratory experiments in this direction promise success, a couple of dressings with baryta-water being followed by a single application of a three-per-cent. solution of aluminium sulphate, and this treatment continued until the desired effect has been secured. Where, however, the baryta-treatment appears unsuitable, one may have recourse to the process in which the stone is first gradually heated and then paraffin-wax or ceresin driven into it. But in the great majority of cases which I have examined the baryta-treatment is undoubtedly appropriate; it has already been used on decayed firestone, Bath stone, Caen stone, Ham Hill stone, Purbeck marble and Portland stone. The account of its employment in the Westminster Chapter House will be found in the Parliamentary Paper "Cd. 1889," 1904.

[1]An article by A. H. Church, F.R.S., Professor of Chemistry, Royal Academy of Arts, published in "The Stone Trades Journal" for November, 1907.

RECLAIMING THE ZUYDER ZEE.—The government has presented to Parliament a bill for the reclamation of a portion of the Zuyder Zee, at a cost of $11,200,000. The work will occupy seven years and will yield about forty thousand acres of fertile land.

The Acton Municipal-Building Competition

IN his annual Presidential address before the Royal Institute of British Architects, Mr. T. E. Colcutt had this to say about the competition for the Acton town-hall, an affair which has deeply stirred the architectural fraternity in England:

"WITH regard to the competition for the Acton Municipal Building, I must ask you to allow me to recall the circumstances so far as they affect the Institute. In the first place, a competition took place which was adjudicated upon by Mr. Macvicar Anderson, and the successful architect, Mr. Hunt, prepared designs and obtained estimates. The lowest estimate, however, was in excess of the sum the local board had at its disposal, and the design was abandoned; Mr. Hunt was paid his fees for this work, and again instructed to prepare plans for a modified scheme. This he did, and a contract between him and the local board was then drawn up, and the official seal was to have been affixed at the last meeting by the then council. Attention, however, was drawn to the fact that this meeting had been called on the day after the official year had terminated, and therefore the stamping would be illegal. It was then arranged that the document should be sealed by the new board. But the new board determined to abandon Mr. Hunt's second scheme, and instituted a second competition. Mr. Hunt then applied for payment of his fees due on the work he had done. The Acton local board then took the extraordinary step of repudiating Mr. Hunt's just demands on the plea that their contract with him, approved and drawn up by the Board, was invalid by reason of the official seal not having been affixed. The matter was first brought before our Competitions Committee and the Board of Professional Defence, and ultimately before the Council of the Institute. The Council agreed with the recommendations of its committee that under the circumstances the competition should be vetoed, and a notice to that effect was put in the *Journal*. It was felt that if a public body could thus take advantage of a legal quibble there was nothing to prevent them recurring to the same tactics in the forthcoming competition, and that, in fact, it was inadvisable for any architect to have dealings with a public body who were acting in a manner which, in a private individual, would not be considered as honorable. It was also felt that as strong a protest as possible should be made against such extraordinary treatment of one of their brethren. The Council having vetoed the competition, I of course could not nominate an assessor when invited by the Acton Board to do so. I quite concurred with the action of the Institute.

"I believe that some members of the Institute were not satisfied with my refusal to nominate an assessor, and that directly or indirectly they were instrumental in bringing to the notice of the Acton board the name of an architect who was willing to undertake the duties of assessor. The result was that this gentleman was invited and has consented to act. I felt it my duty to place before him the facts of the case, but I regret to say that he was unable to take the view adopted by the Institute and by myself as president.

"With regard to the necessity of architects demanding a sealed contract when employed by corporate bodies, my experience, and on inquiry I find that of others, is that such a practice is seldom resorted to. However, I understand that the appointment of the gentleman now acting as assessor to the Acton local board is under sealed contract."

In the same connection, as showing how the other party to the unpleasantness looks on the matter, it is interesting to know that in the *Acton Gazette* for October 25 is published an interview between a representative of that newspaper and the chairman of the Acton District Council (Mr. H. S. Schultess Young, J.P.). Referring to the competition for the proposed new municipal buildings, and the acceptance of the position of assessor by Mr. Norman Shaw, R.A., after the president of the R.I.B.A. had refused to nominate an assessor (in view of the action pending between the Acton Council and Mr. W. Hunt, the successful architect in the former competition), the chairman is reported to have said: "To secure his (Mr. Shaw's) services was a great triumph for the Council. Yes, and a blow to those who thought our competition would prove a failure. It is something as if the Lord Mayor had refused to appoint a person to open a bazaar, and the King himself consented to do so." Interviewer: "Am I at liberty to ask if his fee is very high?" Mr. Schultess Young: "He has consented to accept the sum mentioned in our resolution, namely, 100 guineas. As there will be at least 50 designs to adjudicate upon, and the gentleman appointed by the president of the R. I. B. A. in the previous town-hall competition was paid 50 guineas to decide the best of only six, we are doubly fortunate." Interviewer: "Can you add anything else?" Mr. Schultess Young: "I had better not, for, as someone has said, and many might heed it, 'under the spur of a sympathetic audience a man's imagination will often stride about in seven-leagued boots.'"

ILLUSTRATIONS

THE HARVARD UNIVERSITY MEDICAL SCHOOL BUILDINGS, BOSTON, MASS. MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS.

GENERAL VIEW, LOOKING NORTHEAST.

GENERAL VIEW, LOOKING SOUTHWEST.

FAÇADE OF PHARMACOLOGY AND HYGIENE BUILDING.

NORTH FRONT OF ADMINISTRATION BUILDING.

SOUTH FRONT OF THE SAME.

ENTRANCE TO WESTERN TERRACE AND PART OF PHARMACOLOGY AND HYGIENE BUILDING.

FLOOR PLANS OF GROUP.

SECTIONS SHOWING CONNECTION BETWEEN SCHOOL BUILDINGS AND POWER HOUSE.

Additional Illustrations in the International Edition.

ENTRANCE TO PHARMACOLOGY AND HYGIENE BUILDING.

VIEW LOOKING ALONG COLONNADE, SOUTH FRONT OF ADMINISTRATION BUILDING.

A description of this group of buildings, written by the architects, and a detailed account of the mechanical plant as described by the engineers who installed it, will be found in another part of this number.

NOTES AND CLIPPINGS

THE matter of the consumption of paper in this country, since it includes the production and consumption of wood-pulp, which in turn affects the entire lumbering industry of this country, is a very interesting one. The total value of the paper output during the year 1905 was $188,715,189, which shows an increase of some $60,000,000 over the total for 1900. Of this total it is gratifying to find that only a small fraction can be charged directly to the building industries themselves, for the value of building, roofing and sheathing papers—including also asbestos felting—is expressed by the very modest total of $4,845,628, and as sheathing-papers are in the main made from jute and other fibres, they do not make much of a draught on the forests. This cannot, however, be said of wall-papers, the annual value of which for the year in question reached $3,013,464. As to the building journals, numerous as they certainly are, very few acres have to be denuded of their trees to keep them supplied.

A CURIOUS instance of the unexpected interdependence of things is revealed by the complaint a piano-maker lodges with the editor of *The Music Trades*. Evidently someone has been grumbling over the sombreness and generally inartistic finish of piano-cases, a grievance which those who look about their drawing-rooms with fresh eyes must admit has substantial foundation. Instead of alleging that the trouble was due mainly to the scarcity of San Domingo and other handsomely figured mahogany, Mr. Ebersole declares that piano-makers "are compelled to finish their products in heavy, set colors, instead of permitting the display of rich figured woods, because architects use dark stains on inferior woods to imitate the more expensive. Hence piano-manufacturers must finish their product in dark colors so as to conform with almost any home interior."

The American Architect and Building News.

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OUR recent observation that even the most thoroughly fireproof modern building was largely at the mercy of its contents, through the possible existence thereamongst of explosive agents of great power, receives reinforcement from an incident that occurred last week in the old New York Custom-house building recently vacated and now undergoing alterations. Here, in a forgotten and unused vault on the third floor, was discovered by the startled wreckers a bag of powder and one hundred and thirty military hand-grenades, placed there for the defense of the building in the time of the draft riots of 1863. Obviously, if there was power enough here to defend the building through explosion in the open, there must have been enough to seriously damage it if exploded in a confined space. The possibility of dangerous explosions within buildings is very real, and it takes on many forms. Aside from illuminating-gas—the commonest of all causes—there are steam boilers, chemicals, soda fountains, gas tanks for the oxy-hydrogen lamps or for physicians' use, and sporting ammunition, which at times collects in greater abundance than the user realizes. As there will always be the possibility of explosion underwriters will long continue to find customers in the owners of and tenants in the most fire-resisting of "fire-proof buildings."

A JUDICIAL determination and definition of the exact point where and when the conditions of a proposed competition become operative and binding upon propounders and competitors alike would be a most useful thing to have at hand for professional and lay guidance, and it would tend to relieve the courts of the consideration of those suits for breach of implied contract which architects are perceiving, now more than formerly, that they have a right to bring. We recently drew attention to the curious defense put forward by the authorities in the matter of the Pittsburg High School competition scandal, these gentlemen affirming that their actions were not reprehensible, since as one out of the ten invited competitors had not accepted the terms proffered, the competition had never been legally established and so no breach of implied contract was possible. Just the reverse of this position and contention was taken last week by the Mayor of New York in the matter of the competition for the proposed twenty-three story City Building, which is to be erected in the immediate neighborhood of the old City Hall. In this case, during a meeting of the thirteen invited competitors with the authorities, one of the architects declared at a certain point that he must have forty-eight hours for the consideration of his acceptance or declination of the invitation, whereupon the Mayor, presiding, ruled that inasmuch as five of the competitors then present had already accepted the terms offered the competition was already established, and as the gentleman seemed unable to decide with the needful promptitude it would be just as well that he should withdraw from the room at once, and this suggestion was, of course, at once accepted.

FEELING that the legal proceedings begun by his predecessor involved a matter of very real importance, the new Corporation Counsel for the City of New York recently requested the New York Chapter, A. I. A., to appoint a committee to examine and report on, with recommendations, the matter of encroachments over the building line upon Fifth Avenue. The report with its recommendations met and dealt with the situation very fairly, and though it did protect the Knickerbocker Trust building, we are free to admit that the condoning of the infraction of the law by this building as it will be

left after compliance with the recent court decision, already reported, will work no substantial damage to the public.

IF the Chapter's recommendations are accepted and acted on, the most important result will be the increasing of the width of the roadway from forty to fifty-five feet, which is done by adding to it seven-and-one-half feet from the space within the stoop line—a demarcation long since practically abolished—on each side, a course which legalizes an addition, practically already in being, to the sidewalk width of a similar amount. To the committee's recommendations as to projections at any elevation over twelve feet from the sidewalk level, no exception can be taken; but we feel that below the twelve-foot height encroachment on the public free-way should be resisted. Theoretically, the building-line is the line at the meeting of public and private properties, and, hence, the base or water-table of a building ought not to be allowed to overstep such line; but as it is reasonable, perhaps, to argue that the building-line was intended to fix the position of the face of the building's main wall-surfaces, and as the committee only asks leave to project base-courses ten inches beyond the line and for a height only of three feet, perhaps, it would be unreasonable to cavil. But it is wholly unreasonable that when sidewalks are filled to their capacity the whole stream of passers should be thrown into confusion because the inside file unexpectedly finds itself compelled to steer out into the crowd because, every here and there, some architect has chosen to avail of the license now propounded and place there a "non-supporting ornamental column," intruding on public space just the two feet that a man requires when walking. Still less is it right to put at risk the life and limbs of the foot-passenger making his way, blinded by snow or dust, or with umbrella lowered, close under the lee of a building, by allowing it to be possible for him to trip over a series of steps encroaching two feet upon the public space, even if such steps are "not continuous * * * for more than one-fifth of the width of the lot?" Surely, the difficulties of getting into his building should be overcome at the cost of the owner, not at the risk of his fellow-citizens; it is a disadvantage the architect should be able to cope with as well as with any natural disadvantage of a building-site.

THE *Builders' Journal* has recently published a group of portraits which we find not only interesting and informing, but, what is more, suggestive. The group exhibits the portraits of the architects who are to compete in the final competition for the London County Hall, a competition which, as may be remembered, is being conducted on the lines of a "compound" competition. The portraits of the eight specially invited competitors exhibit men of age, character and experience, as would naturally be looked for in the case of leading architects of the day. The portraits of the twenty-one men who go to make up the fifteen firms selected in the primary competition reveal that twelve of them can hardly have passed more than twenty-five summers, and half of these twelve are not even Associates of the Royal Institute of British Architects. These youthful faces, though unmarked by time and effort, are in their alertness and promise quite as interesting as those of the older men.

WHAT this collection of portraits suggests is that here is information, afforded belatedly, to which the promoters of this competition perhaps had a right at an earlier stage in the negotiation, and as much could be said for the promoters of any other competition. Most business men are fairly good physiognomists and their acts are distinctly affected by the way in which they "size up" the man with whom they are dealing, and it seems like a needless handicap that building-committees in cases of competition should be deprived of one of the advantages which the individual promoter enjoys, for he, supposedly unacquainted with any architect, can easily withdraw from the negotiation if he finds he has stumbled into the office of an architect for whom he experiences an instinctive distrust. It might in many cases be very helpful to the expert-adviser who is called on to present with recommendations to the building-committee several designs, if he could know what kind of man was represented by a given competitor's name. It would be an amusing condition to add to those usually found in competition programmes that the usual sealed envelope should contain not only the name, but the photograph of the designer.

THE report of the A. I. A. Committee on Applied Arts and Sciences, which we print in another column, is noteworthy because it is practically confined to a discussion of the scientific and esthetic possibilities of concrete and reinforced concrete. The space given to the subject is, in itself, an indication of the increased interest in these materials which is being manifested in the profession generally; but the sanguine (in fact, enthusiastic) tone of the report is still more significant and almost leads one to hope that, before long, we may see something produced in concrete which is neither crude and bald, nor only a slight modification of old forms, but which shows that its author recognizes the fact that he is dealing with a new material, calling for a new architectural treatment, and as deserving of truthful expression as if it were wood, brick or stone.

WE do not entirely agree with the committee in dismissing concrete and terra-cotta blocks as structural possibilities and setting down their use as "inimical to art." It seems to us that a concrete block, which does not pose as anything else, may be just as legitimate a structural unit as a block of clay or stone and that it generally contains an air space and may be easily rendered practically impervious to dampness are points in its favor. We have in mind several buildings where these blocks have been used by architects of taste with most satisfactory results. But possibly the committee intended only to ban the concrete imitations of cut and rock-faced masonry which are so frequently seen and than which nothing could be more depressing and distasteful.

Cuba as a Vacation Trip

WHEN the conditions of work in progress are such that one cannot take a vacation in summer, a very agreeable variation is to take a change and rest from the everlasting routine in February or March. In our Northern latitudes there are many cities where, owing to the nearness of the ocean, with the east winds to temper the heat, one can enjoy the summer. But the long-drawn-out wintry blasts, followed by damp, cold weather, such as one gets, for instance, in Boston, seem to make February and March the ideal time to take a vacation.

The object of these necessarily brief and incomplete notes of a short trip to Cuba is to incite others to try it. They will

find, after a brief sail of three or four days on a quiet summer sea, an entire change of all conditions, and become acquainted with a new land, different from the now well-worn European roads. The architecture there is, of course, of the country and the climate, for which we should be thankful. How long it will remain so is problematical. The steamship service is as good as on most of the Trans-Atlantic lines and the fare for the round trip from New York is but $70 in the best steamers, in the season.

At 1 P.M. on a Saturday in February, 1907, with the thermometer at nearly zero, and the dampness in the air often a curse to our seaport cities, the steamer *Morro Castle* pulls out of New York for Havana. It is the "Morro Castle" of our cigar-box customs stamp. The heaviest winter clothing is necessary now, but by the next afternoon one can lounge comfortably on deck.

Soon Hatteras is passed, and the next morning it is apparent that lighter clothing would be comfortable, and the next morning light summer clothing *is* comfortable and little old cold New York is forgotten in the pleasant sunny day's steaming along the coast, not too far distant to see, with a glass, the various hotels which are distributed along the shore. The long, low Florida coast line soon appears, and the Keys, and such a sunset as one dreams of but never sees in Northern climes.

On going on deck early Wednesday morning one finds spread out, seemingly within a few rods, what seems a realistic piece of scene-painting entitled "The Harbor of Havana, with Morro Castle and Cabanas Fortress" dimly illuminated with the pale morning light—an ideal scene, never to be forgotten. Soon the sun rises higher and reality is before you, the Harbor of Havana, with the wreck of the *Maine* in the foreground and the tired, faded old city of the Caribbees against the turquoise-blue sky, with sun everywhere. As in most Spanish cities, landing is by lighter. Here, where lighterage has always been a valuable privilege, few landing-docks have yet been built.

The streets are, on the whole, very clean, and the city is so laid out that it is not difficult to find one's way about, especially as cab fare is the cheapest, the only cheap, thing in Havana. Old travelers on the steamer inform one that hotel accommodations are higher here than anywhere else, not excepting the European capitals—that is, one gets less for the high charges. The rates at one hotel affected by English and American tourists are from $6 to $7 a day and upwards, and here all the arrangements are crude compared with what one would have in a hotel of similar price in the United States. At the lower end of the Prado there are hotels where accommodations may be had at lower rates, sometimes run by Americans, with American cooking and American tourists, but they are not as interesting to one desiring new experiences.

To study the people and their language, not to mention a desirable economy, one of the smaller Spanish fondas is preferable. These afford many picturesque features, such as an open balconied or arcaded patio, with blue and white tiled fountain, its various levels of bowls of cold running water being used to keep fresh and moist small green vegetables such as lettuce, radishes, etc. Cooking is usually done on a small charcoal arrangement, built of cement and tiles, not large or important enough to be called a range. In fact, it constantly surprises one how much cooking is done in one of these small and ill-ventilated kitchens, over such a small heap of charcoal. There are few chimneys in the city. In nine cases out of ten the toilet accommodations open out of such a kitchen, and the fumes of the charcoal and of cooking go, no one knows where. As everything is open to the sky, with all rooms exceedingly high in the clear and doors and windows always open, the results are not noticeably bad. A good airy room in such a hotel would cost perhaps $1.50 per day and the meals can be had here *à la carte* (Spanish cooking) for about $2 per day. Breakfast, consisting of two crisply fried eggs, coffee and bread with butter (butter is always charged as an extra) will cost 53 cents, American money. This will give one an idea of how travelers must pay for their fun in this land of plenty. American money is worth about 10 per cent. more than the Spanish and one finds a "cambio" in which to change money at various convenient spots. A peculiarity of the town seems to be that one does not desire so much food as in the far Northern home, and that smokers can smoke cigars about all the time, while at home they would feel the worse for such constant indulgence. As the best cigar tobacco in the world is grown in Cuba, and as cigars are about the only thing manufactured here, they can be bought fairly "reasonable"; not too cheap, as this would be against the Cuban policy of making foreigners pay well for everything, whether it be fruit or tobacco, both of which are exceedingly plentiful here.

The buildings have all the characteristics of concrete construction, although built usually of coral rock plastered on the outside with cement, and then tinted with water-color. As various coats of different color are put on from year to year, and then washed off by the rain, peeled off by the sun, or rubbed off by contact with humanity, there results often an exceeding rich and interesting color. The buildings are not high, the majority not being over two stories, and the cornices, mouldings, balconies, supports, etc., all seem to be perfectly adapted to concrete construction. The mouldings and edges often have a certain freedom from absolutely straight and rigid lines, looking as if they were done "free hand" with a trowel and not hampered by form or straight-edge, thus adding much to the interest of all the work. This certain freedom of line and edge, hand-made as it were, together with a very old, dusty and tired out or exhausted aspect, the edges worn off everything, may be said to be characteristic of the work of this old city.

In the old cathedral the mouldings of the arches of the nave are sunk, and the upper edge against the plain wall above exhibits this free hand, or free trowel work, and one feels throughout that this is the work of men's hands, unhampered by mechanical devices. The mouldings and flat surfaces are thus made interesting and free from the stiffness which our modern work has, and it all seems to be in perfect keeping with the atmosphere of the place. The dust and dirt and color of many coats of watercolor and rain and sun, through many years, all seem to belong here, and would be missed were things cleaned up. One feels that the old work here is well adapted to concrete construction. It is not an imitation of stone building, with imitation joints, but gives one the impression of monolithic construction.

There is a large, high, modern building on one of the narrow but important streets, with banking offices on the ground floor and offices above, which is all built of reinforced concrete by an American contracting firm. There are fluted Corinthian columns and capitals, the regulation cut-stone treatment of cornices, architraves, belts, etc., all executed with artificial joints, rubbed and smoothed to look as much as possible like cut stone. It looks like a stranger in a strange land and is, by the side of the many fine examples of Spanish Colonial work, a convincing example of how not to design in concrete. For an example of "artificial stonework," with all its depressing color and texture, it is a success. One supposes, as is usually the case, the old inhabitants may like this new sort of thing, but it will be a great pity if this kind of work grows fashionable at the hands of the American protectors or exploiters. Havana in such artificial stone would lose its interest for any one with a suspicion of esthetic feeling.

One thinks of the tropics as a place of ease and loafing, but in Havana there is now a ceaseless activity, and in the vicinity of the park at the lower end of the Prado the brilliant crowds of natives and foreigners and the hundreds of swiftly moving carriages remind one of the Place de l'Opera. Of course, there is not the architecture here, but there is the feeling of gaiety, brilliant sunlight, and the tropical blue sky. In the evening a military band plays and the crowd sit about, or promenade, somewhat as in Piazza di San Marco in Venice. At this season of the year, during certain Sunday afternoons in Lent, the carnival is in full blast. Then Cuban senora and senorita emerge from the seclusion of the shaded patio and, richly dressed and well-powdered, in open barouche, sometimes accompanied by ancient duenna, join the procession up and down the Prado, to be admired by all and to be pelted by the more appreciative onlookers with confetti and serpentina. Here are seen the most beautiful women of the time and place, and it is the one time when it is safe to admire them, and when they show any appreciation of such public attention. We join a group of American men-of-warsmen, sailors and tourists on the lower Prado and proceed to hand out complimentary showers. As the young and blooming beauties receive the most attention, we bestow our favors on the ancient duennas, much to their delighted surprise. There results a great chattering, and reluctant congratulations are poured on the head of her who was once young and perhaps beautiful. One supposes that this unprecedented conduct on our part is laid to the general "queerness" of the foreigners. The look of pleased and startled surprise on the sad, faded old faces was more than ample reward for the cost of a few pecks of American-made confetti and serpentina. When the procession ended the street was literally covered and the gutters filled with the material, but the next morning all had been removed; rather quick work for the tropics.

In the streets devoted to business all is activity, with huge loads of merchandise drawn by picturesquely caparisoned mules, and the principal shopping streets, O'Reilley and Obispo, have suspended over them a series of awnings, giving each quite the air of an Oriental bazaar. There is no loafing, every one is seemingly as busy and active as in our own Northern cities.

American enterprise was brought home to me one morning while strolling through the older part of the town, where streets remind one of Seville or Granada. From out the high-shuttered windows of an old palace came the sweetest music of old Spain, guitar and mandolin with castanet accompaniment, rehearsed for the benefit of a manufacturer of records for graphophones.

The negresses walk the streets with the stately step of queens, often clad in the most brilliant colored mantillas or turbans; the older ones, who care not for the conventionalities, sometimes smoking a big black cigar.

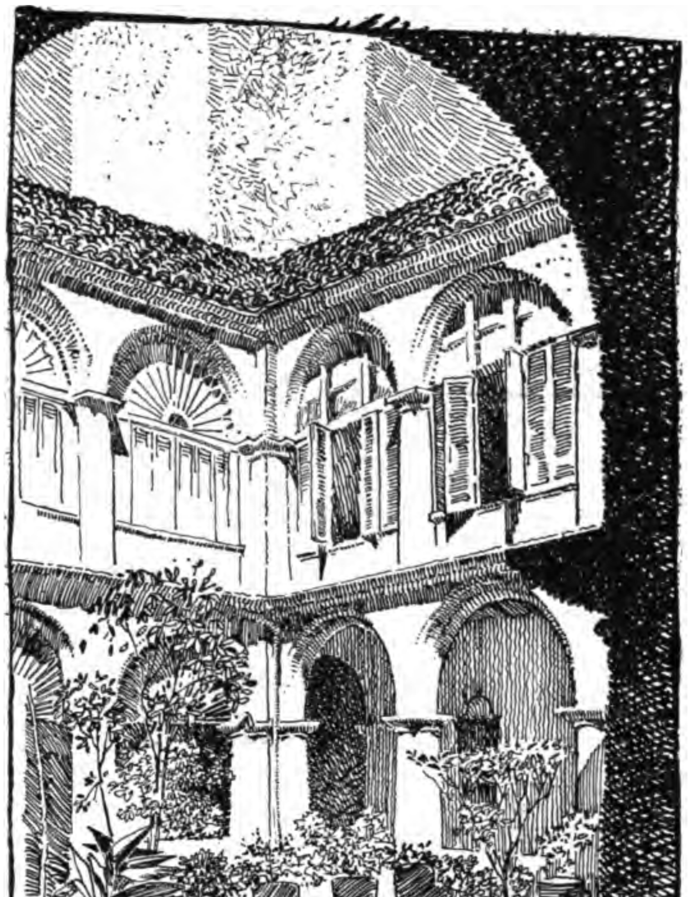
This is a place of balconies. Balconies everywhere, of all

descriptions, but always of good design and perfectly adapted to the material of construction and for their use; sometimes running full length of a building, sometimes being a mere projecting shelf the width of a window, with slight projection; sometimes with simple but most appropriate iron balustrades; sometimes with a cage of coarsely turned wooden spindles set in a simple wooden frame, probably inspired by the Moorish remains of old Spain. These balconies are used alike to snatch a few breaths of cool air by the worker within or to view the passing procession, funerals, "*festas*" and the carnival.

There are a few fine old arcades in the vicinity of the old Cathedral, and much beautifully simple wrought-ironwork. While idly wandering about here we note many of the people moving hastily in one direction, down a queer little dusty side street. It must be a fire or a fight, we think; so, remembering the queer manner in which they manage fires in Italy, I join the current and soon see a spell-bound crowd gathered under an old archway. Pushing my way through and looking over the shoulders of the people four deep, I see there an "arquitecto Americano" sketching. It is our "old college chump" B— T—. There is the usual cordial professional greeting, the interested crowd being much impressed by the touching exhibition of affection which, we assure them, is not unusual among the members of the profession in our own country. Although having made an oath not to touch pencil or paper on the whole trip, being out for a loaf and a rest, T—'s industry and brilliant work being so inspiring we borrow pad and pencil from him and are soon working, oblivious of the admiring crowd, who are evidently impressed. A few of the "little things dashed off" between smokes and drinks accompany this article. The smokes in Havana are good, as are the drinks: Pineapple macerated with its juice, with ice; the water from green cocoanuts; and such orangeade and lemonade as is not dreamed of elsewhere. The ices and ice-creams served in the Hotel Telegrafo Café bring back old Florentine days, and there is a surprising variety of them, the list offering no less than the following bewildering varieties: Twelve "Helados de Frutas" (fruit water-ices), thirteen ice-creams (Cremas de Fruta Helados), and twelve different kinds of ices, all with tropical fruit or nut flavoring. With all this wealth of delicious drinks suitable for the tropics, there is, of course, to be found the "bar American," where one can see the American tourists of a certain type imbibe from morning till dewy eve "el coak-teel American."

The electric-car line runs out through a residential suburb recently built, called Vedado. Here are swell residential suburban houses, usually of one story, with colonnades on front and sides, very high stories, doors and windows from the floor to the ceiling, built of concrete or cement-covered coral rock, and charmingly enclosed each in its own garden of fine tropical trees and plants. Overhead is the deep blue sky, with here and there a black speck floating about. When the black speck reaches the ground you see it is the turkey buzzard, not a beautiful bird but useful, and treated here with the greatest respect, as usual in the tropics. These villas, although adapted to the climate and the needs of the people, all often exhibit a slip-shod decadence, and the more one sees of them the more one loves the beautiful vegetation, growing so vigorously, as in one great palm-house or grand conservatory in our own land. The electric cars continue out into the country to Marianao (passing Camp Columbia, where are quartered about 5,000 of the U. S. Army of Pacification), and beyond a branch steam line takes one to the bathing-beach with the temperature 75° C. and water exactly right, where behind a barrier reef we take a sea bath secure from the inquisitive attentions of the sharks, which are plentiful in these waters. Colonel Gorgas, the U. S. Army Engineer who planned the sanitary reforms of the city and who is now in charge of similar work on the Canal Zone at Panama, thinks that with the banishment of yellow fever accomplished, in the near future our Northern people will turn to the tropics for an easier life, free from trying climatic extremes. It certainly seemed to us, as we floated in the calm sea, that it was exceeding stupid for people to persist in living on a stern and rock-bound coast, simply because there they first landed. There has evidently been a great field for dealers in plumbers' supplies and fixtures since our Government took charge of the works here, and the results are remarkable; the town has become fairly free from the yellow fever and other diseases formerly considered unavoidable in the tropics. After the bath a siesta, with "Cigarros de Habana" and a small thimble of Curaçoa, comes a ride back through the most fertile country in the world. One sees by the roadside fence-posts putting forth leaves. They tell you these are simply saplings cut and driven into the ground, which in a short time put forth roots and foliage.

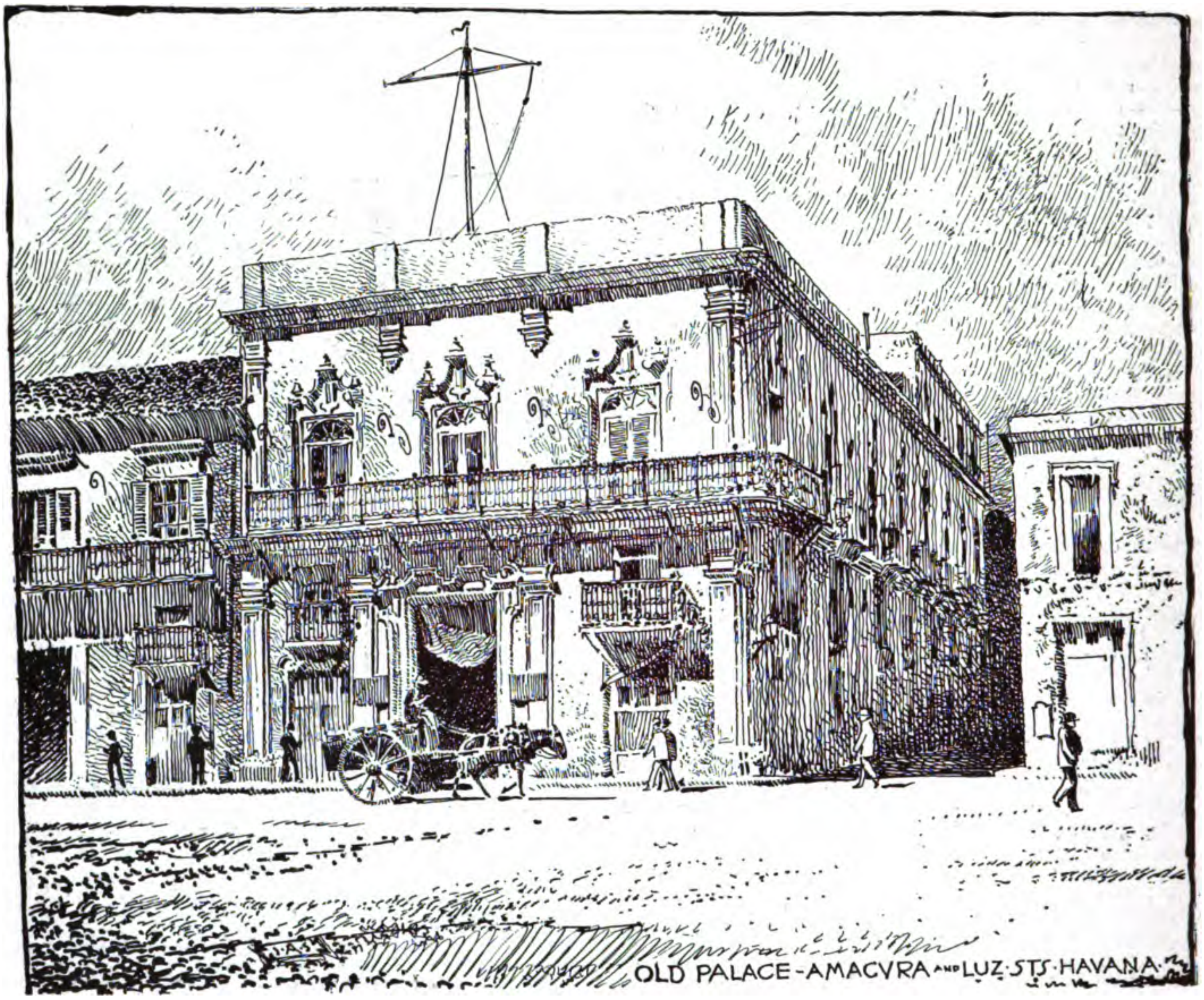
A most interesting old farm-house, the "Casa la Finca de Campana," T— and I caught sight of on our homeward trip,



and agreed it was worth many sketches, it being so simply but beautifully proportioned. Seen from a distance it fitted the landscape well, and when measured it turned out to be no mean cottage but over eighty feet long and altogether very interesting and characteristic.

While wandering through the hot and dusty streets one comes upon the old Belem Church at the corner of Compostella and Luz Streets, with its garden overgrown with a rank growth of all kinds of tropical verdure bursting out above the walls, and huge palms soaring nearly as high as the tower, and hibiscus with its large pink flowers suspended just over the heads of the passersby, and great trees with crooked, fantastic limbs, with large hanging black seed-pods, made a picture possible in no clime save in the Spanish Caribbee. We are indebted to Sr. Alfred Martinez of the School for Youths, on the opposite corner, for a seat in his balcony, the only possible point of view we could get from which to sketch this fine old church.

The names of the streets are often suggestive of the Inquisi-

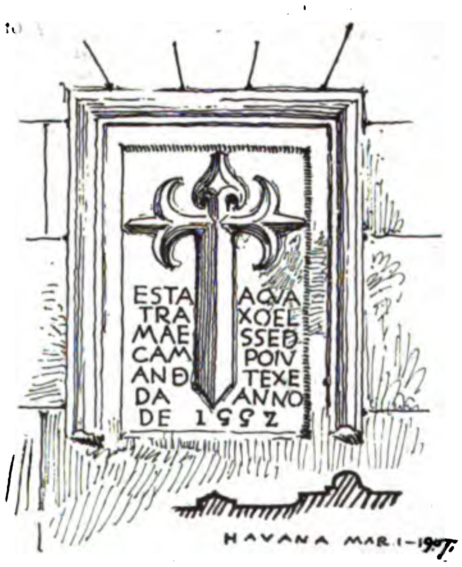


tion, and the fine powdered dust, the worn-off edges, the washed-out colors, the sun (which *shines* here) and the blue sky (if we only had a little of this mildness in our own clime), and the tired decadence, are all of Old Spain.

The interior of the chapel of the old church of San Francesco, now used as the Cuban Custom House, seemed worth a measured sketch, as its proportions were remarkably fine. If not of concrete, it is of such a design as is suitable for concrete construction. Although the dimensions of the piers may seem large on paper, the actual work did not look too massive, but altogether presented a fine interior. The absence of all interior church fittings or decorations, the modern ones being generally in such poor taste, further added to the pleasure of studying it, bare, dusty and pervaded with the odors of the Indies as it was.

When the British took Havana in 1762 the English Admiral took this church for the use of his men, turning it into a Church of England. When the English left it the Roman Catholics considered it desecrated and have never used it since as a place of worship. The present Roman Catholic Cathedral of Havana is built of rock, without the usual coating of cement on the outside. It is therefore rather dark and gloomy, and its principal façade is remarkable for the number of horizontal planes and curves upon which its various features are designed.

The Tacon Theatre (now called the National Theatre), when it was built some years ago, was said to be the largest theatre in the world; La Scala of Milan being second and the Boston Theatre the third in size. It is remarkable for the movable part of the roof (called here "jalosies"), which can be rolled back for coolness.



In Cabanas Fortress, a sketch of the entrance of which is shown, there is a tablet set by General Wood near the place where the Cuban patriots were executed, kneeling to face the firing squad, the marks of the bullets being plainly visible on the walls. There was usually one musket in the firing squad unloaded, or with a blank cartridge, so that the executioners would not know that they were responsible for the life of any of the prisoners.

In Morro Castle the place is pointed out where the Spanish garroted the captured pirates, the bodies, after the execution, being thrown into a chute, discharging into a deep pool of the bay, where the sharks which infest the harbor finished the work.

The old Espada Cemetery is well worth a visit, as it shows many interesting old marble slabs with beautifully carved arms of ancient Spanish families—many of these slabs being warped and bent much the same as a wooden plank would be. Here the usual method of interment was in walled-in compartments, which a corpse could occupy for a few years, after which, if not removed or paid for, it would be thrown into the bone heap. During the Weyler régime in Havana, the "reconcentrado" being driven into Havana, often pressed for sleeping quarters, it is said, sometimes sought rest over night in these

unoccupied grave compartments. There are, of course, certain quarters owned in perpetuity by the estates of the deceased which are not disturbed.

The carved panel taken from an old wall in an obscure street shows a curious combination of the sword, spear and various other pointed and edged weapons and the cross, and the date 1552, perhaps indicative of the Spanish methods of conversion in early times.

As all things end, so must this picnic. It is a change from the Maine woods and from the civilization of Europe, and those who journey here are sure to return. J. A. SCHWEINFURTH.

35 CONGRESS STREET, BOSTON, MASS.

Report of the A. I. A. Committee on Applied Arts and Sciences

"ALTHOUGH the exact relationship existing between concrete and steel reinforcement under a given condition is yet to be accurately determined, and the structural use of reinforced concrete is yet to be reduced to an exact science, and although the manipulation of concrete and its application to structural uses has not as yet become an art, yet the fact that in its use and treatment there are immense scientific and esthetic possibilities brings the subject of reinforced concrete well within the field of study of this committee, especially at this time, when the general topics of steel structure and concrete reinforcement are before the Institute for discussion. It is essential throughout such discussion to keep clearly in mind the true and abiding status of Architecture and the Architect. The Architect is not a mechanical fabricator of mathematical diagrams. His highest concern is with the ideal, and his first sketch should present an idea, an idea which is conceived in beauty. The past has demonstrated that Architecture as the expression of the ideal can materialize in but one or the other of two great manners: that of the articulated structure, unit added to unit, and that of the plastic mass. The most noble development in the first manner is in the architecture of masonry (brick or stone) and this development has reached its logical limit; in no way, except it may be in mere size, its least noble attribute, is it to be excelled. Under the vital art of this first manner lay an intuitive science; under the too transient beauty of the work of the second great manner lay nothing of science at all, and so this architecture has well nigh vanished except as some adherence to the principles of the first manner has interposed to save. And now comes the ghost of what might have been and calls for an incarnation, feeling (if a ghost can feel) that in reinforced concrete science is preparing a body which can be vivified with the spirit of art. If this feeling is substantiated, to the architect is opened up a new range of possibilities. The architect becomes in a sense a sculptor, a moulder of monumental mass; not the fantastic figure who, at first with sharply insistent blows and then with infinite persuasive tappings, releases the form imprisoned in the block, but a creative constructor, who builds up his ideal and shapes it by the irresistible though tender moulding of mass and form. In this the architect assumes no new function, but develops that feeling which by nature and of necessity inheres in the architectural mind. The architect as well as the sculptor revels in this feeling of mass taking form under his skillful manipulation; and the feeling for plasticity and for mass in flux is potent in the true architect, even though he be designing in that most refractory medium, a masonry-clad steel skeleton. In most of his work the architect has to content himself with an intellectual substitute for real feeling and his conscious delight is rather intellectual than emotional as the idea takes form in the sketch and in preliminary plan and elevation. His fingers may itch, they do itch, to feel the flow of the mass, but the feeling remains abstract and intellectual. Therefore certain architects, if not indeed the architectural body in general, are viewing with keen interest, when not actively aiding, the development of the possibilities of this fairly new and altogether plastic medium, reinforced concrete; a medium which really does flow and is moulded and through which the form appears in gracefully unfolding stages, till the final mass stands revealed, a veritable unit. One cannot, in thought, connect with this materialization the shock of unloading beams, the rattling musketry of riveting, the petty and fussy application of fireproofing and surface coating. In fancy, as almost in fact, the architect sees the flowing mass take form under his own hands.

"The masonry-clad steel structure of to-day is an architectural anomaly, representing as it does rather a branch of engineering than of architecture; and it is doubtful if any treatment of the incrusting material, be it brick, stone or terra cotta, can make the structure architecturally interesting as compared, for instance, with the interest which attaches to a well-designed brick cottage or stable even. The steel structure, however, will continue to occupy its own domain. But the call of concrete is heard inviting architecture to occupy an as yet undeveloped territory.

"Though the use of concrete goes back into antiquity, plastic architecture would seem to be in the veriest infancy and would seem also to be asking the genius of this age to give it perfect expression and make it worthy to stand with the architecture of the past and the yet-to-come. Though the past be examined for precedent little will be found. Rome used concrete in bulk—but undeniable evidence of a scientific use of the material is wanting. Rome employed masonry in bulk—but again evidence of a scientific use is wanting. Rome applied superficially the arts of other times and countries, but of itself left to posterity only monuments expressive of a highly temperamental force, breathing little or nothing of spirituality. Persia covered with stucco or veneered with beautiful tiles her masses of crude masonry. The Arabians and the Moors expressed their emotionalism in a plastic architecture decorated with a skim coat of ornamental plaster or an incrustation of tile, intricate in pattern and beautiful in color. The concrete of the mass was but mud, and the science of building was unknown. In such material beautiful day dreams were realized only to crumble when the spell was past. The Spanish missions were built with rare feeling for mass and light and shade; but feeling swayed and science did not guide. With the science of to-day to guide and the art experience of the past to illumine, into what logical, noble and beautiful forms should not concrete shape itself, to the end of an enduring, spiritualized architecture.

"In this study your committee has taken no cognizance of the concrete block as a structural possibility, believing that such blocks, as well as terra cotta used in the same manner, are mere imitations of stone, and when used after the manner of stone are impossible in the architecture of sentiment, and, like all imitations of one material in another, are inimical to art.

"The possibilities, even the esthetic possibilities, within the range of renforced concrete construction can hardly be overestimated. Little beyond the introductory chapter has been written in the history of reinforced concrete, and every advance in the science of its manufacture and use will signal an advance along the line of artistic application.

"Except in well-defined types, designed to serve certain well-defined uses, it is impracticable so to carry masonry construction beyond and behind the façade as to result in a homogeneous structure—wanting which architecture becomes but a hollow sound. The architecture of a reinforced plastic material may and logically will express itself throughout the entire structure to the remotest core. The unity, the truth, the harmony of the whole may in every part be manifested. Therefore, again the possibilities inherent in concrete present themselves alluringly to the architect to whom the art means as much as does the science of building.

"The architectural brain is not so congested by the weight of pregnant thought that at a blow a Minerva shall issue forth full-fledged and full-armed. That is not the history of the evolution of an architectural style. It will take time and struggle and developed artistic perceptions in this, as in former cases, to reveal the possibilities of beautiful and of monumental design.

"It may well be conceived that a moulded architecture, so to speak, an architecture of flowing and harmoniously interrelated masses may not appeal immediately to the architect who has been taught that his art consists in näively piling up child's building blocks on a large scale. Whatever may be urged against the deadly dulling practice of following the line of least resistance in architecture, certain it is that a material in which it is

easier, as well as more logical, to fashion new and appropriate forms than to follow cut and dried conventions cannot be regarded as other than a vivifying factor in a possible architectural development and its advent hailed with delight. When architects relieve themselves of the notion that monumental architecture, for example, consists solely in a row of classical columns superimposed upon a basement pedestaled, it will be a wholesome day for the art they profess to practice. Probably ignorance, inability and self-distrust in the architectural ranks will remove to some more or less remote future the development of a monumental architecture expressing itself in new forms fashioned in new materials. Yet it is possible that, in this as in other ages, commercialism, itself so devoid of esthetic tendencies, will pave the way to the realization of an esthetic ideal. A material which holds in itself the qualifications for commercial use will in that very use reveal its esthetic possibilities. No material which puts into the hand of the architect power to produce permanent mass and form and add the enrichment of light and shade, color and texture, will long be ignored when science has made its use commercially possible. It would then seemingly remain only for science to demonstrate the practical value of reinforced concrete, in respect to its physical properties, and art must unfold whatever it holds of beauty.

"The steel skeleton developed from commercial necessity, and to clothe and protect that skeleton the architect, naturally, used whatever means lay at his command; stone, brick, terra cotta and metal were called into requisition. To clothe the skeleton in one or another or all of these materials became a fixed habit with the architect. So that when concrete came into use not only was it ignored as a possible clothing for steel, but when the skeleton of reinforced concrete was set up it was itself clothed after the existing fashion for steel. Such is the fatal force of habit! Granting to concrete the qualities ascribed to it, that it is fireproof, that it may be rendered moisture proof, that once in place it is not affected by atmospheric and climatic conditions, that it can be permanently colored, can be moulded and chiseled, that it can be formed in place and need not be applied piecemeal—what better material could be sought for clothing the steel skeleton? And why the need of any cloak at all to such material when it has been treated with any manner of decency or respect by the designer? So esthetically there would seem to be unlimited possibilities in reinforced concrete.

"The pre-eminence of concrete for all manner of commercial work has not been established and may never be. The installation of reinforced concrete must proceed under favorable conditions of workmanship, moisture and temperature, and besides there must enter into the process an element of leisure which is now incompatible with the requirements of certain forms of commercial work. The erection of the steel skeleton, clothed after the established manner, can proceed independent of external conditions; and operations may begin, advance and terminate almost independently of the seasons, which thus will not seriously interfere with the uniform and rapid progress of a work of great magnitude. It is construction in wood, as well as certain classes of steel structures and of masonry building, that concrete seems destined entirely to supersede. But whatever conditions dictate the use of structural concrete, the esthetic treatment of the material becomes incumbent on the architect.

"Although it has not been its purpose to study that especial phase, it seems to your committee that the esthetic possibilities inherent in terra cotta and faience as covering materials for the steel skeleton have not as yet been in the highest degree realized, while, as stated before, concrete as a possible covering has been ignored. Simultaneously with their development in the field already assigned to them, it is not inconceivable that ornamental terra cotta and tile, beautiful in color and texture, and also sculptured stone will be called upon to embellish and distinguish, though not in any manner to clothe or conceal, the concrete structure. The presence of these materials may be needed as a saving grace in these early days of design in concrete, to save the designers from a too brutal conception of the forms they deem the material must necessarily take. There is an unfortunate though marked tendency now in what should be a refined and restrained domestic architecture to shape concrete, and its lath and plaster imitations, into the crude though characteristic forms of the old mission work. It is needless to say that these forms have no meaning outside of their original environment and would not have existed there but for the exigencies of the case—the crude nature of the materials procurable and the absence of all skilled labor.

"But to-day, with art and science co-operating, it would seem as though architecture were on the verge of an awakening. Commercial architecture with us is beginning to feel the thrill. Abroad, monumental architecture as well is showing signs of a renewed joy in life and structural concrete, both of itself and embellished with richer materials, furnishes the new and seemingly adequate medium of architectural expression.

"Irving K. Pond, Chairman."

"Claude Bragdon, Elmer Grey, Charles Z. Klander, Bertram G. Goodhue."

COMMUNICATION

THE NEW SEAL OF THE PITTSBURGH ARCHITECTURAL CLUB.

To the Editors of The American Architect:

Gentlemen:—I notice in your issue of November 30 that the new seal of the Pittsburgh Architectural Club is given a very prominent place in the very interesting article, "A Great Exhibition," but nothing is said about it.

The seal acquires importance because it was the result of a competition which was held immediately before the exhibition for the purpose of adopting a permanent seal which should give the club a standing commensurate with the great exhibition they undertook to give.

A decided credit is, therefore, due Mr. J. Horace Rudy of York, Pa., a member of the club, for his very successful design of the seal, which was extensively used on all the literature pertaining to the exhibition.

Trusting you will find space to give Mr. Rudy his deserved place in the eyes of an art-loving public, I am, very truly yours,

Rheinhardt Dempwolf.

York, Pa., December 11, 1907.

ILLUSTRATIONS

CUBAN SKETCHES BY J. A. SCHWEINFURTH.

VIEWS OF CASA LA FINCA DE CAMPANA.

MEASURED DRAWINGS OF THE SAME.

INTERIOR OF OLD PALACE, HAVANA.

WROUGHT-IRON BALCONY RAILINGS, HAVANA.

MEASURED DRAWINGS OF THE CHAPEL OF THE CONVENT OF SAN FRANCISCO, HAVANA.

BELEM, HAVANA.

WALTHAM SAVINGS BANK, WALTHAM, MASS. MESSRS. HARTWELL, RICHARDSON & DRIVER, ARCHITECTS.

Additional Illustrations in the International Edition.

PROTESTANT CHURCH AT STREHLEN, GERMANY: TWO PLATES.

NOTES AND CLIPPINGS

Steel Paving.—A section of steel pavement has recently been laid in the Rue St. Martin, Paris, to test its usefulness. The steel blocks are nearly seven inches long and an inch and a third thick, and are ridged on both sides. They are laid in cement, so that the tops of the ridges just reach the surface. The ridges are so close together that a horse's shoe covers at least three ranges of them. It is believed that such a pavement will prove superior to asphalt in being less slippery, and more durable than a pavement of wooden blocks.—*Youth's Companion.*

Berlin to Buy a Forest.—The *Lokal Anzeiger* says that the municipality of Berlin is negotiating for the purchase of a huge forest in the Spree district, east of the city, from the State Forestry Board. The purchase price is $10,000,000. The purpose of the acquisition is to establish new municipal water works and make a people's park.